

DEPARTMENT OF GEOLOGY
UTAH STATE UNIVERSITY



GRADUATE HANDBOOK
AND POLICIES

revised August, 2011

UTAH STATE UNIVERSITY, DEPARTMENT OF GEOLOGY
GRADUATE HANDBOOK AND POLICIES

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INTRODUCTION

Welcome to the Graduate Program in Geology at Utah State University! The faculty and staff wish you success and look forward to getting to know you better.

The purpose of this handbook is to provide you with a quick and convenient source of information about policies and procedures within the Department of Geology. *Items in this handbook do not replace University or School of Graduate Studies policies and requirements. Rather, departmental policies and forms are in addition to those.*

Students are responsible for informing themselves of current policies and requirements and they should refer to the USU General Catalog:

<http://catalog.usu.edu/>

Important information is also posted on the School of Graduate Studies website:

<http://www.usu.edu/graduateschool/>

...including many forms you need:

http://www.usu.edu/graduateschool/degree_completion/forms.cfm

Also useful is the USU Student Code:

<http://www.usu.edu/studentservices/pdf/StudentCode.pdf>

Contacts

Your thesis advisor is your primary resource in the Geology program here at USU.

If you have any questions concerning items in this handbook, please direct them to the Geology Graduate Director:

Joel Pederson

joel.pederson@usu.edu

797-7097, Geology room 112

For help navigating the nuts-and-bolts of USU, visit our Graduate Administrative Assistant:

Marsha Hunt

marsha.hunt@usu.edu

797-0515, Geology main office

Getting Started at USU

1. All graduate students should plan on arriving on campus at least one week prior to the beginning of classes.

2. A month or more before the academic year begins, you will need to fill out a departmental information sheet. This is received from and returned to the Graduate Administration Assistant in order to set up your assistantship. If you change your e-mail, local address, or phone number during the year, please provide the new information to us promptly.

3. In this same timeframe, you will also need to tell the Grad Admin Assistant how many credits you will be taking in the upcoming Fall semester so that your tuition waiver can be arranged. You must first discuss with your primary advisor what coursework or thesis credits you will be enrolling in. Full time graduate students typically enroll in at total of 6 to 9 credits at the 5000-level or higher.

4. You must register each semester prior to the Registrar's deadline, typically one week or more before classes begin. Registration is conducted through the "ACCESS" part of USU's Banner system online:

<http://banner.usu.edu/>

5. The department communicates primarily through e-mail, and you must provide the Grad Admin Assistant with your email address. To set up a USU aggiemail account (and also gain access to campus computer labs), you must be registered, and then follow the instructions in this tutorial:

<http://it.usu.edu/files/uploads/tutorials/create/create.html>

6. Desk and office space is assigned in the department according to seniority. Check with the Grad Admin Assistant or your advisor regarding the assignment of office space.

7. You will likewise be assigned a mailbox in Geology room 203.

8. Each graduate student receives a set of keys, which must be picked up at the Key Office. Students must pay a one-time key deposit of \$25, which is refunded when you return them upon completion of your degree program.

9. Picture I.D. cards are available at the Taggart Student Center after you have registered. This I.D. card serves as your library card.

10. Student parking stickers are available at the Parking Office on the north edge of campus.

11. The department's Distinguished Lecture Series is held on Mondays at 3:30 pm, throughout the academic year. *You are expected to attend these.* Speakers are drawn from industry, government agencies, and academia, and broad exposure to the ideas and research of other geoscientists is a critical aspect of graduate training.

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GRADUATE PROGRAM POLICIES

Admission Requirements

The Department of Geology generally follows the minimum requirements for admission laid out by Utah State University's School of Graduate Studies, specifically for our MS programs:

- Completion of an undergraduate degree in the broad Geosciences by the time you are matriculated
- 3.0 or higher GPA on your last 60 semester or 90 quarter credits
- Score at or above the 40th percentile on the Graduate Record Exam (GRE)
- Three satisfactory letters of recommendation

The following additional stipulations are specific to the Geology Department:

M.S. Applications

If a M.S. applicant has GPA or GRE scores that are slightly below the School of Graduate Studies minima above, the Graduate Program Director may request that the student still be admitted with matriculated status. If a student has below a 2.5 GPA or below the 30th percentile on the Verbal or Quantitative GRE, the Graduate Program Director may, with the concurrence of the faculty, request that the student be admitted with nonmatriculated status. If the student performs well (maintains at least a 3.0 GPA while taking at least 9 credits of graduate courses) during his or her first semester, the Graduate Program Director may then request the student's transfer to fully matriculated status.

Ph.D. Applications

Superseding the Grad Studies minima, the Department of Geology requires that applicants for our Ph.D. program possess at least a 3.4 GPA for their most recent degree and scores of at least the 50th percentile on the Verbal and Quantitative GRE. If the applicant has GPA or GRE scores lower than this, but still above the Graduate Studies minima, the Graduate Program Director may, with the concurrence of the Geology faculty, still accept the student into the program.

Prerequisite Coursework

Although not strictly an admission requirement, individual students may need to complete specific undergraduate coursework to prepare them for their graduate program. The seven preparatory core courses generally expected by the Department of Geology are:

- 1) Introductory or Physical Geology with laboratory
- 2) Minerals and Rocks (Earth Materials)
- 3) Historical Geology
- 4) Sedimentation and Stratigraphy
- 5) Geomorphology
- 6) Structural Geology
- 7) Field Methods or experience

Decisions about any exceptions to the above core prerequisites in a student's graduate program are made by a student's primary advisor, their Advisory Committee, and in consultation with the Graduate Director.

These core Geology courses cannot appear on the graduate Program of Study (see section below), nor can they be officially audited. Thus, completion of these prerequisites generally will be accomplished through lecture attendance and the passing of the regular exams in the courses.

Financial Support for Graduate Students and Utah Residency

Graduate Assistantships

Graduate research and teaching assistantships, and their accompanying tuition waivers, are available to students in our plan-A (Thesis) graduate programs. They are not available for students in the plan-B (non-Thesis) AEG-MS degree.

Graduate research assistantships (RAs) are awarded according to the funding secured for such by individual faculty members. Research assistantships are to meet the research needs of projects, and may or may not directly relate to a student's thesis.

Graduate teaching assistantships (TAs) are limited in the number distributed to each department at USU. They are distributed at the discretion of the Department of Geology. As a general rule, they are not *automatically* renewed for successive years.

Graduate students with TA/RA appointments must be registered as full-time graduate students. This requires a minimum of 6 credit hours until the required number of coursework and Thesis-research credits are completed (30 credits for MS, 60 credits for PhD). If it is necessary for a student still receiving TA/RA support to enroll after that point, the minimum drops to 3 credits (of GEO 6990/7990 Continuing Grad Advisement).

TA/RA appointments are typically for 50% time (20 hours per week), and you are considered a full-time student and a part-time university employee. If your appointment is 50% time, you may not accept additional university employment without permission of the department head. With an assistantship, and being a full-time student, concurrent off-campus employment is very strongly discouraged. Check with the Graduate Director before undertaking external employment.

In order to gain continuing support beyond the second and third semesters of study, for MS and PhD students respectively, you must have an approved Program of Study form on file in the School of Graduate Studies.

Increase in Assistantship after Advancement to Candidacy

As an incentive for PhD students only, the value of the TA/RA assistantship is increased once you have officially "advanced to candidacy" after your comprehensive exams and Dissertation proposal are complete. Specifically, the assistantship is increased by \$1000 per semester (\$2000 per academic year), beginning the semester following the submittal of the Application for Candidacy form to the Graduate School. This is a Geology department-level policy only and the funding comes largely from generous alumni giving.

Tuition Waivers

All non-Utah resident geology graduate students (MS and PhD) receiving a graduate teaching or research assistantship (TA/RA) are provided a waiver of the *nonresident* portion of tuition from the School of Graduate Studies. This is provided for one year only, so you must apply for residency in Utah after that time (see below). These waivers cannot be applied to *auditing* coursework below the 5000 level.

Matriculated PhD students supported by a TA or RA also receive a fee waiver for the *in-state portion of tuition*. The student must be registered for at least 6 credits. These waivers cannot be applied to *auditing* coursework below the 5000 level. For more information go to:

<http://www.usu.edu/gradsch/TuitionWaiverPolicy.htm>

For MS students, *in-state tuition* waivers or grants are not automatically received from the university. Instead they are mostly provided from the Department of Geology itself, with the help of alumni gifts. These will be awarded as possible and according to academic merit.

Utah Residency

The Graduate School policy is to only cover nonresident tuition for the first 12 months of your program! Thus, if you are not a formal resident of Utah (but are a U.S. citizen), *you must take the steps to gain formal residency in your first year here*. This includes things like gaining a Utah drivers license, registering as a voter in Utah, providing financial and tax information, and etc.

Information about the steps toward residency *and the application form you are required to fill out* are available at the School of Graduate Studies and Admissions websites:

http://www.usu.edu/graduateschool/costs/residency_requirements.cfm

<http://www.usu.edu/admissions/residency/>

Government Financial Aid

As a graduate student, you may apply for financial aid, including work study, even if you have a TA or RA. If you qualify and receive it, work study may be used in conjunction with an RA and has advantages for both the department and student. Application information and forms are available at:

<http://www.usu.edu/finaid/>

Student Health Insurance

Full-time graduate students receiving graduate assistantship support are required to have health insurance. All enrolled graduate students, including those less than full time or not receiving assistantship support, are eligible for this insurance.

In fact, if you receive an RA or TA, we must automatically enroll you in USU's student health insurance plan and you are assessed a relatively affordable fee during registration.

If you prefer to be covered by other insurance, you must actively document your coverage and annually waive the USU insurance plan via a website process--before September 5th.

More information is available at:

<http://www.usu.edu/asusu/gss/insurance.cfm>
<http://www.usu.edu/health/healthinsurance/>

Graduate Student Senate

The Graduate Student Senate provides travel support to professional meetings for graduate students giving presentations. Chances of support are best early in the academic year as this funding is limited and the fund is quickly depleted. Go here and download info:

<http://usugss.blogspot.com/>

Geology Department Funding Sources

The Geology Department has three named fellowships and scholarships that can be awarded to graduate students in support of thesis field research. *To qualify, the Program of Study form must be on file in the office of the School of Graduate Studies.* An application form is provided/posted for submittal in the Spring semester, and selection is usually made late in the Spring semester with funds available in early July. Awards are usually on the order of \$1000.

Criteria:

Peter R. McKillop Memorial Scholarship

Must have demonstrated a genuine interest in or aptitude for some non-science related activity, such as arts, music, or service to the community.

Beryl O. And Tura H. Springer Memorial Scholarship

Must be a declared Geoscience major.

Must have at least junior-level standing as an undergraduate or be a graduate student.

Must have demonstrated academic achievement

J. Stewart Williams Graduate Fellowship

Must be in good standing with a minimum 3.0 GPA.

Must have completed and submitted a fully signed Thesis Proposal.

In addition, the Department of Geology provides, upon request, modest travel support, either to meetings if you are presenting or for research-related experiences. These are distributed as funds are available, and also considering prior support provided. But first, Grad Student Senate support must be exhausted or attempted. *To make such a request, submit to the Department Head a copy/version of the Grad Student Senate form (link above), and an additional 1-2 page proposal/description in the case of a research experience.*

External Sources --see Appendix C

Professional organizations, such as the Geological Society of America, AAPG, SEPM, Sigma Xi, and others make competitive awards for thesis research. Graduate students are encouraged to work

with their thesis advisors in seeking such support for thesis research. Most applications are due during the winter months, and are designed to be undertaken in the first academic year of a graduate degree program (*see Appendix C*). In all cases, applications require information about the intended thesis research.

The U.S. Geological Survey's EDMAP program, and to a certain degree, the Utah Geological Survey (UGS) provide thesis support for mapping investigations. If appropriate, work with your thesis advisor in seeking support from these sources.

The National Science Foundation (NSF) provides Graduate Research Fellowships that can provide significant and prestigious financial support for research. These are very competitive, and must be applied for immediately, in the first semester of a program. They are particularly geared towards PhD students. NSF also has various Dissertation Research Enhancement grant opportunities for somewhat later in a PhD student's program. Search NSF for more info:

http://www.nsf.gov/funding/education.jsp?fund_type=2

Guidelines for Graduate Teaching Assistants

TA Assignments

Teaching assignments will not be the same for all; some may end up teaching more lab sections than others. Assignments are made with deference to your own class schedule. Every attempt is made to keep assignments equitable, but this is not always possible.

Typically, each full TA is assigned 3 two-hour labs for the same course, for a total of six contact hours per semester. In cases where the labs are three hours long, two lab sections would be assigned. In some instances, it may be necessary to make a mixed assignment between lab courses.

Most of your twenty hours per week as a TA consists of lab preparation time, office hours to meet with students, and grading lab assignments. On occasion, other tasks may be assigned, such as proctoring and/or grading exams, and/or providing other service to the department. Faculty course instructors should inform their assigned TA(s), as well as their lecture sections, of the teaching assistant's responsibilities.

You will be provided with a list of students registered for your lab section. Only those students on this list should be allowed in your lab and given lab materials. Any student not on a lab list must go to the university registration office and register for a lab section. *Lab assignments or permission to add a lab section can be made only by the faculty instructor.*

You may allow an occasional student to attend your lab for make-up purposes, but it is important that you do not exceed the room capacity under any circumstances. If the make-up is for a student that is not from one of your labs, communicate fully with the student's regular TA.

Performance

As a teaching assistant, you are a representative of this department. Act responsibly and dress appropriately for the classroom. You have a contractual responsibility to arrive prepared and on

time for all labs.

Under no circumstances can the TA make the decision to cancel a scheduled lab. This is solely the responsibility of the supervising faculty instructor. If you must miss a lab, including for the purposes of a professional meeting, contact the faculty instructor well in advance to let them know about the situation. *It is up to you to find a suitable replacement to teach your lab.* Failure to meet an assigned lab without contacting the supervising faculty member could result in the loss of your Teaching Assistantship.

Upon completion of your lab, erase the chalk board, close the windows, turn off the lights, return any borrowed chairs to their proper place and return all lab materials to their proper storage place. If the projection screen and shades were lowered, raise them. If you have the last lab for the day, please lock the door when finished.

Sexual Harassment

Teaching assistants are persons of authority in the classroom environment, and you are responsible for reporting incidents of sexual harassment to the faculty instructor and/or the Department Head immediately. Teaching assistants should not tolerate sexual harassment in their classrooms, including harassment between students.

Teaching assistants should not date or extensively socialize with students during the period in which they have grading or supervisory responsibilities over them. You should read the information and statements of university policy on sexual harassment:

<http://www.usu.edu/aeo/sexualharass.html>

Teaching Evaluations

It is recommended that each teaching assistant be evaluated early in the semester (after teaching three to four labs). An evaluation this early is meant to be a *constructive* exercise permitting you to modify your teaching techniques if needed. A copy of the form is in Appendix A.

The evaluation will be carried out in the lecture section by the faculty instructor, and the results discussed only between the instructor and the TA.

Lab Materials

Most GEO 1115 (Physical Geology Lab) materials are stored in room #202. Materials borrowed from this room be returned immediately after your lab so that other TAs will have access to them. In fact, you may be sharing lab materials with one or two other lab sections meeting at the same hour. In general, each rock and mineral set should be shared between two students. For example, taking 12 sets will cover a class of 22 students with one set for the TA.

The Geology Department has many impressive, large teaching specimens, mostly in Geol #101. You are encouraged to enrich your teaching by using these materials. Please inquire with the faculty instructor for the course about accessing these, and again, return all specimens promptly.

All TAs are responsible for maintaining the integrity of the rock and mineral sets and map

materials. If specimens have become sufficiently hand worn and dirty so that they are no longer representative or functional, they should be replaced. Check with the faculty instructor about finding appropriate replacement material before throwing anything away.

Safety in the Lab

You are expected to communicate to your students the reasonable precautions that must be taken in using lab facilities and materials.

For example, the glass plate used to test for hardness should be placed firmly on the table and not held in the hand. Also, at the start of each semester, acid bottles should be rinsed, re-labeled if needed, and refilled from the large bottle stored in the fume hood in room #115. Use only those hydrochloric acid bottles that are labeled clearly to show the contents to be dilute hydrochloric acid. Caution students that *acid should not be placed indiscriminately on every specimen*; when it is used, it should be blotted off or rinsed off.

If there is any possibility that a student has gotten acid in the eyes, immediately take the student to the eye wash station. *Having a wet floor is the last concern - slam the handle and turn the eye wash on full*. The student should be taken to Student Health Services (Medical Building, north of the stadium) immediately after a thorough washing.

Rights to Data, Plans for Publication and Conflict Resolution

The School of Graduate Studies requires the completion of “Rights to Data, Plans for Publication” paperwork, at the time of the thesis defense. This form comes with the packet of materials for the defense, and it designates authorship, copyright restrictions and ownership of research results. Authorship of manuscripts for publication resulting from thesis research should be determined by mutual agreement between the student, the thesis advisor, and the student’s graduate committee.

Graduate students may not automatically be considered first author of all publications resulting from their thesis research. Research is commonly a component of a larger project funded by their advisor and involving additional students and/or other professional colleagues.

Students may initiate a manuscript for publication, however circumstances may dictate that the student is unable to prepare a manuscript for publication in a timely fashion. Typically, submission of a manuscript to the advisor should occur no later than six months following completion of the degree program. If a manuscript is not forthcoming, the adviser may initiate the manuscript and/or may assume senior authorship.

Ownership of thesis-related research materials generally resides with the Department of Geology and/or the advisor. Representative rock samples and/or thin sections cited in a thesis should be left with the advisor or stored in the department thesis-specimen depository. Any thesis-related materials derived from externally-funded research projects must be retained by the advisor as the advisor is ultimately responsible to the funding agency.

If leaving residency before completion of all degree requirements, the student is required to deposit copies of pertinent thesis research documents (field notes, field maps, cross sections, thesis drafts, etc.) with the advisor.

Conflict Resolution

The Department of Geology has a well-deserved reputation for being a cordial environment. Unfortunately, disagreements between students and their advisors sometimes occur. The following is an attempt to clarify the procedure that should be followed in these circumstances. Please note that all parties involved in a conflict have an obligation to communicate about problems or potential problems early on, and to actively work toward their resolution.

- 1) Issues of concern must be discussed by the student and the student's advisor and then, if necessary, with the student's thesis committee. Advisors and the thesis committees are likely to be in the best position to evaluate the technical aspects of the research project.
- 2) If problems still exist *after discussions with their advisor and committee*, the student should speak with the Graduate Director. In this capacity, the Graduate Director will try to be fair and listen (separately) to both sides of the disagreement and will then try to mediate an agreement between both parties.
- 3) If the Graduate Director is unsuccessful in mediating the situation, the issues go to the greater Geology Department's Graduate Committee, consisting of the Department Head, Associate Head, and Graduate Program Director. The committee will make a recommendation to both student and advisor/committee.
- 4) As a last resort, a student can go to the Graduate Dean and request his/her intervention, as outlined in the *Code of Policies and Procedures for Students at Utah State University*. Hopefully, any situation that develops within our department can be resolved before this step is called for.

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MASTER OF SCIENCE (PLAN A) PROGRAM

MS Program Description and Requirements

The Geology MS involves advanced study, and has a focus on original research. There are six specializations with the Geology plan-A graduate programs: 1) Geomorphology and Quaternary Sciences; 2) Geophysics; 3) Hydrogeology; 4) Petrology and Geochemistry; 5) Sedimentology and Paleocology; and 6) Structure and Tectonics.

Only the Plan A thesis option is allowed for the MS degree in Geology. Program Prerequisite: Completion of a BS or BA in geology, biology, physics, chemistry, engineering, or related field is required for matriculated status.

Although advanced courses should be selected primarily from Geology offerings, additional courses may be selected from other departments on campus relating to the Geosciences, such as Biology, Civil and Environmental Engineering, Mathematics and Statistics, Plants, Soils, and Climate, and Watershed Sciences.

Requirements

30 credits of graduate work are required for the MS degree, with at least 24 being from USU (as opposed to transferred from another institution). The recommended distribution is 20 credits of coursework and 10 credits of thesis. At least nine to fifteen credits of 6000-level geoscience courses are recommended for the degree program.

A 3.0 grade point average must be obtained in required coursework as listed on the Program of Study. Only two grades of less than B (C to B-) will be accepted as part of the required degree program as listed on the “Program of Study for Master’s Degree.” Thesis credits will be graded P-F only (i.e., no letter grade will be given). Geology graduate students using department or University facilities and/or under geology faculty supervision must register for a minimum of 3 credits every semester, up to and including the semester in which the thesis is cleared by the School of Graduate Studies. Registration may not be required during the summer.

Coursework Prerequisites

As discussed in the “Admission Requirements” section above, individual students may need to complete specific undergraduate coursework to prepare them for their graduate program. In particular, these seven courses:

- 1) Introductory or Physical Geology with laboratory
- 2) Minerals and Rocks (Earth Materials)
- 3) Historical Geology
- 4) Sedimentation and Stratigraphy
- 5) Geomorphology
- 6) Structural Geology
- 7) Field Methods or experience

Individual decisions about any exceptions to the above core prerequisites in a student's graduate program are made by a student's primary advisor, their Advisory Committee, and in consultation with the Graduate Program Director.

These core Geology courses *cannot appear on the graduate Program of Study*, nor can they be officially audited. Thus, completion of these prerequisites generally will be accomplished through lecture attendance and the passing of the regular exams in the courses.

MS Time Line

Admission to the MS program in Geology is made with the expectation that the student will proceed through the program efficiently.

MS students should plan on finishing their degree program in two years. Logistics associated with field work may extend the time line somewhat (e.g. to two and one-half years). Maintaining matriculated status (i.e. within the degree program) after three years is at the discretion of the primary advisor and Graduate Director, based upon satisfactory progress (see section below).

The School of Graduate Studies will only provide a waiver for out-of-state tuition for the first academic year of your graduate program. This is why you must apply for Utah residency.

The School of Graduate Studies has a 6-year limit for MS degree completion. Beyond this time, one would need to re-apply to the program. Furthermore, after 8 years, coursework is retired and cannot be used towards a degree program without being recertified.

Graduate student research is commonly funded by agencies that require timely acquisition, analysis and reporting of results. Students who fail to fulfill their funded research obligations in a timely, professional and satisfactory manner may be removed from the overall research project at the discretion of their academic advisor.

The following is a semester-by-semester timeline to be used as a guide for completing the Geology MS degree program in two years. Delaying off this schedule makes it very difficult to finish in two years:

Geology MS Timeline

Fall Semester, Year One

- ___ Meet early and often with your advisor to define a research project.
- ___ Establish thesis committee, submit Grad School's "Supervisory Committee Approval" form to Grad Director (who will forward it to Graduate School).
- ___ Have first thesis committee meeting
- ___ Complete "Program of Study for Master's Degree" form with committee and submit to Grad Director (who will forward it to the Department Head for signature and then to Graduate School).

Spring Semester, Year One

- ___ Apply for research grant opportunities, if appropriate.
- ___ Write Thesis proposal draft with advisor mentoring, submit refined draft to committee.
- ___ Have a committee meeting, revise, and get Thesis proposal signed, submit to Grad Director.

Summer Semester, Year One

- ___ Conduct Thesis research. *Apply for residency in the state of Utah if necessary.*

Fall Semester, Year Two

- ___ Continue research and begin writing Thesis.
- ___ Make 15-minute presentation during Distinguished Lecture Series or at a professional meeting. Poster presentations do not count.
- ___ Have committee meeting to appraise progress and discuss timeline for degree completion.

Spring Semester, Year Two

- ___ Complete writing of Thesis. Submit refined draft to committee and allow 2 weeks time for review. When approved by committee members, this becomes the "defense copy" of your thesis.
- ___ With committee approval and signatures regarding timing, submit "Appointment for Examination" form to School of Graduate Studies. Forms must be submitted 2 weeks prior to the defense date requested.
- ___ Defend Thesis. You must be registered for at least 3 credits the semester that you defend.
- ___ Make defense corrections to Thesis. Submit committee-approved (signed) thesis to Graduate Studies for copy and format editing, along with the "Data and Copyright and Plans for Publication" form.

Summer Semester, Year Two

- ___ Make Graduate School edits. Submit "Application for Graduation" and other forms to Graduate Studies.
- ___ Make final copies of thesis to be bound, and deliver these along with binding fees and forms to the Merrill-Cazier library. Check out the library's checklist regarding this:
<http://library.usu.edu/etd/includes/LibraryRequirementChecklist.pdf>
- ___ ****Check the USU Graduate Calendar for important dates and forms related to your graduation****
- ___ Complete Geo Department's "Exit Form for Graduate Students" before Thesis grades can be turned in

If Thesis not Complete in Second Year

- ___ If all degree requirements are not completed by the end of *the semester following* the defense, then student must register for at least one credit the semester the final thesis is submitted. If not completed within one year of defense, thesis must be re-defended.
- ___ Continue to make presentations to department or at a professional meetings once per academic year.
- ___ Matriculated status may be changed to "non-matriculated" after three years, at discretion of academic advisor and Graduate Director and based upon satisfactory progress.

The MS Thesis Committee

Students are encouraged to establish their committees as soon as possible during their first semester, but the thesis committee must be established no later than the middle of the student's second semester on campus.

In consultation with your advisor, select 2 or perhaps 3 other committee members, with one being from “outside” the topical specialty of your thesis. Two of the overall committee members must be from Geology (including our Emeritus faculty) or other USU departments. One member can be from another institution, but they must hold an adjunct appointment at USU, having been approved by the Dean of the College of Science and the Provost (*see Appendix B for a listing of Adjunct Faculty in our department*).

Faculty should be consulted about serving on the committee and their consent obtained. Complete the “Supervisory Committee Approval” form with all required signatures and submit it to the Graduate Director who will forward the form to the School of Graduate Studies.

The thesis committee provides input in the process of course selection and thesis proposal construction. Once thesis research has been initiated, it is recommended that graduate students meet with their committee at least once a semester to discuss progress, problems or deviations from the original thesis proposal.

At least one thesis committee meeting must be held within the regular nine-month academic year. At this meeting, the committee will evaluate progress toward completion of degree requirements. Failure of the graduate student to convene at least one thesis committee meeting within the regular nine-month academic year will be interpreted as a sign of unsatisfactory progress.

No changes in committee membership are permitted within six weeks of the thesis defense - this is a School of Graduate Studies requirement.

The MS Program of Study and Courses

Once a thesis committee has been approved by the School of Graduate Studies, the graduate student should then meet with the advisor and committee members to determine and fill out a "Program of Study for Master's Degree" form, laying out a course of study appropriate for the intended thesis research. This form must be delivered to the Geology Graduate Director who will forward it to the Department Head for signature and then the School of Graduate Studies.

MS students will not be allowed to receive TA support or instate tuition waivers in their second academic year until the Program of Study is signed and filed at the School of Graduate Studies.

On the Program of Study form you should write in or select your research specialization. Remember, the Geology plan-A degrees have six specializations: 1) Geomorphology and Quaternary Sciences; 2) Geophysics; 3) Hydrogeology; 4) Petrology and Geochemistry; 5) Sedimentology and Paleoecology; and 6) Structure and Tectonics.

The Program of Study represents a contract—stick with it. If you must make changes later during the course of study, the form must be updated for the School of Graduate Studies or you will not be able to graduate. This requires that your advisor and the Geology Grad Director approve the changes and send a memo to the School of Graduate Studies.

Distribution of Credits

The recommended balance for the required 30 credits is 20 credits of coursework and 10 credits of Thesis research. In fact, 10 Thesis credits (GEO 6970) is the maximum that can be taken. After that, any remaining non-coursework credits must be Continuing Grad Advisement (GEO 6990).

For utilitarian purposes of filling out a semesters credits only, the department's weekly Distinguished Lecturer Series (GEO 6800, sec. 1) can be taken for 1-credit.

No more than 12 credits of 5000-5999 level coursework may be used for a graduate degree.

No more than 3 credits of 3000-4999 level courses may be applied toward the degree. These 3000-4999 level credits must be from outside your major area.

It is recommended that MS students take at least three, and preferably five, 6000-level courses to broaden their understanding of the various disciplines within geology and to ensure exposure to areas other than those directly related to their thesis research.

You may not include the credit received for the TA training course (INST 7920) toward your MS degree.

Registration Requirements

Graduate students using university facilities and/or under faculty supervision must register for a minimum of 3 credits per semester up to and including the semester in which the thesis is successfully defended. This applies only to the regular academic year, not summer. If a student is not using facilities or faculty time, the Graduate Director may write a request to Graduate Studies

verifying this and waiving the 3-credit requirement, but the student will be subject to a \$100 fee per semester. Following the thesis defense, registration policies of the School of Graduate Studies apply.

Appointment as a TA/RA requires 6 to 9 credits per semester until the 20 credits of course work on the "Program of Study" are completed. After that point, the 3-credit minimum enrollment may be satisfied by registering for GEOL 6990, Continuing Graduate Advisement.

Grades and GPA

Only two grades of less than "B" (e.g. "B"- to "C"-) will be accepted as part of the required degree program as listed on the Program of Study. The School of Graduate Studies will not accept "D" grades. An overall 3.0 GPA must be obtained on required course work as listed on the Program of Study.

If you fall below a 3.0 GPA, the School of Graduate Studies will place you on probation, and you cannot receive financial aid or TA funding. You have one semester to raise you GPA and retain matriculated status.

Thesis research credits will be graded Pass-Fail only, and are listed as Incomplete each semester they are taken. When your degree program is complete, they are changed to Pass.

Only the Geology Graduate Director can change these thesis-credit incompletes, as their "instructor of record". Before changing the incompletes to Pass, the Graduate Director must see the thesis binding slip from the library, ensure that any departmental equipment checked out and USU keys are returned, and receive affirmation from the major advisor that all products and deliverables are complete.

The MS Thesis Proposal

After deciding upon a particular research topic, the next step is to write a Thesis proposal. This should be completed as soon as possible for a variety of reasons. Most importantly, creation of the Thesis proposal will help you to focus and organize your research project, and your Thesis committee will be able to provide input during the writing and review stages of the proposal.

The Thesis proposal is a contract of sorts between the student and the thesis committee. By signing the document, all parties agree that the research is of an appropriate nature and the methods described are adequate. This provides a safeguard against excessive additions or changes during the lifetime of the research project.

Yet the project as described in the thesis proposal is not completely cast in stone. Research projects commonly evolve and change and, *if the student and committee are in agreement*, then the originally-outlined project may be modified.

Format

The body of the MS thesis proposal should consist of on the order of 20 pages of double spaced text. In addition, there will be references, possibly tables or figures, and a schedule of tasks. The body of text should consist of the following parts at the minimum:

1) INTRODUCTION

- a) Project goals/hypotheses
- b) Significance

2) BACKGROUND

- a) Setting
- b) Previous Work—topical and regional literature review

3) METHODS

- a) Field, laboratory, computational
- b) Data analysis and synthesis

4) SCHEDULE

semester-by-semester plan for completion

5) REFERENCES

Include only those papers cited in the body of your proposal. The departmental standard for citation format is Geological Society of America publications.

Remember, the Thesis proposal is just that, a proposal. Do not attempt to write your entire Thesis at this time. As with most aspects of working on your Master's degree, communication between you, your advisor and your thesis committee will help things to go more smoothly.

The MS Thesis

Format

Obtain the current version of the School of Graduate Studies Publication Guide for their requirements regarding Thesis format.

In consultation with your advisor, choose a geoscience journal whose format you will follow. Geological Society of America publications are our default standard for style, and a style guide is available from them:

<http://geosociety.org/pubs/>

When questions arise regarding style and format, discuss them with the editorial staff in the School of Graduate Studies office. The thesis coordinator offers seminars on thesis writing and thesis formats on a regular basis. Watch for notices.

One new requirement: In addition to a regular scientific abstract for your Thesis, USU now requires a “public abstract” as well. This is a non-technical summary of the work that can be read and understood by non-specialists. This is a skill that is increasingly important in required in the sciences.

Some common rules/mistakes: You may reduce tables and figures but captions must remain full size and have the same size/style of print as the text. All section headings, figure and table captions, and plate titles *must agree verbatim* with the lists of same in the front of the thesis. Only references cited in the text should appear in the list of references. If a reference is important enough to list, it should be cited somewhere in the text.

Role of the Advisor and Thesis Committee

Frequent communication with your advisor is critical in structuring your thesis document.

Your advisor and thesis committee should not be used as copy editors for grammar and format. Their role is to evaluate the methods, the logic, synthesis of data and conclusions, but *not* to spend hours correcting style and spelling errors. The more time that they have to spend on editing leaves less time for dealing with the science of your work.

Preliminary drafts should be reviewed by the thesis advisor, not by the entire committee.

Students should be aware that the form and content of a thesis and the level of expectation by an advisor vary for any number of reasons: different kinds of research problems and methodologies that may be applied, changes in faculty, different abilities of graduate students, access to data, funding, etc. Comparisons with other theses, past or present, are commonly misleading and can generate unwarranted tension and anxiety.

Once the thesis draft is in reasonable form, and with the advisor's consent, the draft should then be reviewed by all committee members. *This draft is not the defense copy.*

Upon approving a thesis draft for defense, Thesis committee members, including the advisor,

should be allowed at least two weeks for review of the draft. *Committee members may refuse to review theses when other departmental or professional obligations conflict with a timely (two-week) review.*

Once approved by the committee, this becomes the defense copy. This version will not be returned to the candidate nor will any further changes be made in the thesis document by the candidate until after the defense. Your committee must have the defense copy of the thesis at least two weeks prior to the defense. If there are photos, large plates or appendices not quite ready for expensive duplication, at least one copy should be made available to the committee for the two-week period prior to the defense.

Defense Preparation and Scheduling

Your Thesis defense is often viewed as the last major hurdle on the path to receiving the MS degree. The length of your public presentation of your research should be about 30 minutes. This leaves time for set up and questions afterwards, while still fitting within the 50-minute classroom timeslot that many attendees will have. There are things that you can do now to help avoid conflict and tension during the last few weeks of writing, revising and defense preparation.

You are responsible for scheduling your thesis defense with the School of Graduate Studies after approval of your advisor and consultation with your committee. Remember that all committee members must have read the thesis before agreeing to schedule the defense. Scheduling requires paper work and signatures.

There are several reasons to avoid trying to defend in the summer. First, most faculty are on a nine-month contract and they have other responsibilities and obligations during the summer. At the least, this makes it nearly impossible to schedule a summer defense. Secondly, there is an enrollment/financial reason to strictly avoid defenses outside of the regular fall and spring semesters. Having to enroll in the summer in order to defend ends up costing money no one has.

If it is absolutely necessary to defend your Thesis during the summer and/or undertake post-defense revisions, faculty consent must be obtained no later than the end of spring semester.

Multiple copies of theses, either defense copies or final versions, should not be run off on Department of Geology printers and photocopiers, unless you pay for them.

Completion of the Degree and Binding

After the Thesis signature page is signed by the committee, the process is turned over to the School of Graduate Studies. Consult their webpage and materials to determine current practices are for scheduling and reviewing theses, gaining the Dean of Graduate Studies signature, and graduating.

Before a Thesis can be bound, it must be duplicated. In addition to copies you want for yourself, the Department of Geology requires one bound copy, and the USU library requires two. Most thesis advisors request one as well. The plates and figures to be placed in back pockets and fold-out figures embedded in text must also be duplicated and fan-folded to a size appropriate for binding.

Perhaps the last thing you will do as a Geology grad student is complete the Department's "Exit Form for Graduate Students", which is required before your Thesis research grades are submitted.

Monitoring and Evaluation of MS Student Progress

It is in the best interest of the student, advisor and department to see that Master's degrees are completed in a timely manner. Continuing TA support, tuition waivers, and other forms of financial support for students are contingent upon satisfactory progress towards the degree.

Review will be an ongoing process, and evidence of satisfactory progress includes: a) your at-least-annual committee meetings and their associated memo from your advisor; b) the completion of the Program of Study; c) thesis proposal; d) annual presentations; e) success in obtaining grant funding; and f) performance in graduate coursework.

Unsatisfactory progress may be indicated through: a) failure to follow the graduate student time line presented above; b) unsatisfactory GPA and academic probation; c) your rate of progress in coursework; d) lack of thesis committee meetings; e) failure to make satisfactory progress on thesis research.

If unsatisfactory performance is perceived by the thesis research advisor or Graduate Director, the Geology Graduate Director will speak with the student and, if necessary, thesis committee. The Graduate Director will then write a memo of notification regarding unsatisfactory progress for the student's file and provide the student and advisor with copies.

If, over the semester following the above notification, the student continues to make unsatisfactory progress toward the degree (as determined by the advisor, thesis committee and Geology Graduate Director), the student will be placed in non-matriculated status and the School of Graduate Studies will be notified. This ends the student's participation in the Geology Graduate Program.

UTAH STATE UNIVERSITY, DEPARTMENT OF GEOLOGY
GRADUATE HANDBOOK AND POLICIES

APPLIED ENVIRONMENTAL GEOSCIENCE (PLAN B) M.S. PROGRAM

AEG MS Program Description and Requirements

The Applied Environmental Geoscience MS degree is a terminal degree program, requiring a combination of advanced courses selected from Geology offerings, as well as additional courses relating broadly to the Geosciences. The AEG-MS degree is also offered both through USU's Regional Campuses and Distance Education program:

http://distance.usu.edu/degree_programs/

The AEG-MS degree has two tracks: Energy and Environmental. Program Prerequisite: Bachelor's degree in Geology, Earth Science, or related science discipline.

Plan B (non-Thesis) only; see graduate requirements in USU graduate catalog for description of plan B reports. The plan B report is usually a review of literature, with conclusions drawn after conceptualizing an area of inquiry, planning a systematic search, and analyzing and critiquing the acquired information. The summary and conclusions developed should enhance knowledge in the discipline. Plan B reports should follow the same format specifications as theses and dissertations and are expected to reflect equivalent scholarship standards, even though they may be less intensive and do not demand original research as does a Plan A thesis. Plan B papers are defended, but are not reviewed by the School of Graduate Studies assistant dean or signed by the graduate dean.

AEG-MS students are generally not eligible for graduate assistantships or nonresident and instate tuition waivers.

Requirements

A total of 32 credit hours is required for graduation with the MS in Applied Environmental Geoscience. The recommended distribution is 29-30 credits of coursework and 2-3 credits of thesis to obtain the required 32 credits for the MS degree. Twelve or more credit hours should be in support courses outside of geology. At least 16 credit hours should be in geology, including Thesis credits. Graduate students using Department or University facilities and/or under geology faculty supervision must register for a minimum of 3 credits every semester, up to and including the semester in which the thesis is cleared by the School of Graduate Studies. Registration may not be required during the summer.

Only two grades of less than B (C to B-) will be accepted as part of the required degree program as listed on the "Program of Study for Master's Degree." A 3.0 grade point average must be obtained in required coursework as listed on the Program of Study. Thesis (Plan B report) credits will be graded P-F only (i.e., no letter grade will be given).

The AEG MS program follows most of the same guideline as the Geology MS program described above. Below is only that information for the Plan B AEG degree that differs from the Plan A degree.

AEG Time Line

The AEG MS program in Geology is designed to be completed in no more than two academic years. Maintaining matriculated status (i.e. within the degree program) after three years is at the discretion of the primary advisor and Graduate Director, based upon satisfactory progress (see section below).

The School of Graduate Studies has a 6-year limit for MS degree completion. Beyond this time, one would need to re-apply to the program. Furthermore, after 8 years, coursework is retired and cannot be used towards a degree program without being recertified.

The following is a semester-by-semester timeline that can be used as a guide for completing the Applied Environmental Geoscience MS degree program in two years:

Applied Environmental Geosciences MS Timeline

Fall Semester, Year One

- ___ Meet early and often with your advisor to define a focus for coursework and Report.
- ___ Establish thesis committee, submit Grad School's "Supervisory Committee Approval" form to Grad Director (who will forward it to Graduate School).
- ___ Have first thesis committee meeting

Spring Semester, Year One

- ___ Focus on coursework
- ___ Complete "Program of Study for Master's Degree" form with committee and submit to Grad Director (who will forward it to Department Head for signature, and then Graduate School).
- ___ Complete Thesis Report prospectus, get committee signatures of approval

Summer Semester, Year One

- ___ Conduct further thesis literature review, take coursework if possible.
- ___ Apply for residency in the state of Utah if applicable.

Fall Semester, Year Two

- ___ Begin writing Report with mentoring from advisor.
- ___ Have committee meeting to appraise progress and discuss timeline for degree completion.

Spring Semester, Year Two

- ___ Complete writing of Report. Submit refined draft to committee and allow 2 weeks time for review. When approved by committee members, this becomes the "defense copy" of your report.
- ___ With committee approval and signatures regarding timing, submit "Appointment for Examination (Nonthesis/Plan B)" form to School of Graduate Studies. Forms must be submitted 2 weeks prior to the defense date requested.
- ___ Defend Report. You must be registered for at least 3 credits the semester that you defend.
- ___ Complete defense corrections to Report and gain committee and Department Head signatures.
- ___ Make final copies of thesis to be bound, and deliver these along with binding fees and forms to the Merrill-Cazier library. Check out the library's checklist regarding this:

<http://library.usu.edu/etd/includes/LibraryRequirementChecklist.pdf>

Be sure to check the USU Graduate Calendar for important dates related to your graduation

If Thesis not Complete in Second Year

- ___ If all degree requirements are not completed by the end of *the semester following* the defense, then student must register for at least one credit the semester the final Thesis is submitted. If not completed within one year of defense, thesis must be re-defended.
- ___ Matriculated status may be changed to "non-matriculated" after three years, at the discretion of the major advisor and Graduate Director, and based upon satisfactory progress.

AEG MS Program of Study and Courses

Once a Thesis committee has been approved by the School of Graduate Studies, the graduate student should then meet with the advisor and committee members to determine a course of study appropriate for the intended thesis research, and fill out the "Program of Study for Master's Degree." This form must be delivered to the Geology Graduate Director who will forward it to the School of Graduate Studies.

For the AEG degree, 32 credits are required. The Department of Geology recommends 29-30 credits of coursework and 2 or 3 credits of thesis research. Up to 12 non-USU transfer credits may be applied, if not utilized for a different degree. See "Requirements" section above for more guidelines. For utilitarian purposes of filling out a semesters credits only, the department's weekly Distinguished Lecturer Series (GEO 6800, sec. 1) can be taken by Logan-campus residents for 1-credit.

For students accepted into the Distance Education AEG-MS program, a more prescribed list of suggested courses that are available can be obtained from the RCDE program:

http://distance.usu.edu/degree_programs/?_d=124

The Program of Study represents a contract—stick with it. If you must make changes later during the course of study, the form must be updated for the School of Graduate Studies or you will not be able to graduate. This requires that your advisor and the Geology Grad Director approve the changes and send a memo to the School of Graduate Studies.

The registration requirements, and GPA criteria for the AEG MS degree are the same as those for the Geology MS degree program.

AEG MS Prospectus and Report

The report for the AEG MS degree is not the same as a Thesis conducted for the (Plan A) Geology MS. It reflects the same level of scholarship, but does not hinge upon conducting a major piece of original scientific research.

The USU School of Graduate Studies states that the Plan B Master's report, "... is usually a review of literature with conclusions drawn after conceptualizing an area of inquiry, planning a systematic search, and analyzing and critiquing the acquired information. The summary and conclusions developed should enhance knowledge in the discipline."

From the Department of Geology's perspective, in addition to: a) a literature review; and b) the identification of a scientific problem; AEG Reports should indeed c) report scientific data; and d) some analysis of those data. The data may be newly gathered by the student, or compiled from previous work into a coherent dataset. The analysis may, for example, be a first-order investigation of the trends or statistics of the dataset, especially utilizing computational tools.

Thesis Prospectus

Your prospectus is a short proposal for undertaking your Thesis report, and it should be completed in your first year of study as a stepping stone towards writing the report itself.

The Thesis prospectus briefly describes the problem, background, methods, and analysis you will employ. The AEG MS prospectus is expected to be shorter than a full Thesis Proposal for a Plan A degree, on the order of 5-10 pages. The audience it is written for is your thesis committee.

The prospectus should include a standard-format coverpage with your committee's signatures, when approved. The body of the prospectus should likewise include the following typical parts:

1) INTRODUCTION

- a) Problem, goals, hypotheses if appropriate
- b) Significance

2) BACKGROUND

- a) Previous Work—a starting review of the first-order topical and regional literature

3) METHODS/ANALYSIS

- a) Field, laboratory, computational
- b) Data analysis and synthesis

4) REFERENCES

Include only those papers cited in the body of your proposal. The departmental standard for citation format is Geological Society of America publications.

UTAH STATE UNIVERSITY, DEPARTMENT OF GEOLOGY
GRADUATE HANDBOOK AND POLICIES

DOCTOR OF PHILOSOPHY PROGRAM

PhD Program Description and Requirements

The Doctor of Philosophy in Geology requires original research in a specific area of geology. The successful candidate must demonstrate a breadth of understanding in geology, as well as a depth of understanding in his or her chosen area(s) of emphasis. Dissertation research should be carried out over a significant period of time (i.e., at least one year or three semesters in residence). This significant and original research must be presented in a written dissertation and defended in an oral examination. This work should be of such scope and quality that more than one journal or conference articles can be derived from it.

There are *two program tracks* for the PhD in Geology: *academic* and *professional*. The academic track is designed to prepare graduates for a career in academia or other teaching-related settings; it includes classroom teaching experience under the supervision of a faculty teaching mentor. The professional track is designed to prepare graduates for work in professional careers within extractive or environmental industries. It may include computational coursework relating to information systems or spatial analysis, and completion of an industry internship is encouraged.

Besides these two tracks, the PhD in Geology also shares the *six specializations* of the Geology plan-A graduate programs: 1) Geomorphology and Quaternary Sciences; 2) Geophysics; 3) Hydrogeology; 4) Petrology and Geochemistry; 5) Sedimentology and Paleoecology; and 6) Structure and Tectonics.

Requirements

Students completing a PhD in Geology must fulfill the following requirements:

Complete at least 60 credits beyond your M.S. (including at least 15 credits of GEO 7970 dissertation/research), or if entering with only a B.S., complete 90 credits of graduate coursework (including at least 21 credits of GEO 7970 dissertation/research). Each course must be completed with a minimum grade of B, and you must maintain a minimum cumulative GPA of 3.3.

Academic Track: Successfully teach one geology course under the supervision of a faculty mentor, receiving GEO 6900 (teaching internship) credits. Coursework in pedagogy may be pursued, as approved by student's dissertation committee.

Professional Track: Completion of professional internship program for GEO 6900 (co-op/internship) credits is encouraged. Coursework developing computational skills may be pursued, as approved by student's dissertation committee.

Pass a written comprehensive examination showing depth and breadth of knowledge in geology and the student's area(s) of emphasis. The student may be required to take additional classes to satisfy any conditions for passing the exam.

Successfully complete a written dissertation research proposal and defend it during an oral comprehensive examination. The oral comprehensive exam will include questions of a deep and probing nature, and may range beyond the specialization of the dissertation proposal.

Successfully complete and defend a written dissertation. The dissertation document may consist of several papers submitted or to be submitted for publication. The defense will be oral, including a public presentation of the work and successful closed-door defense to the faculty committee.

Coursework Prerequisites

As discussed in the “Admission Requirements” section above, individual students may need to complete specific undergraduate coursework to prepare them for their graduate program. In particular, these seven courses:

- 1) Introductory or Physical Geology with laboratory
- 2) Minerals and Rocks (Earth Materials)
- 3) Historical Geology
- 4) Sedimentation and Stratigraphy
- 5) Geomorphology
- 6) Structural Geology
- 7) Field Methods or experience

Individual decisions about any exceptions to the above core prerequisites in a student’s graduate program are made by a student’s primary advisor, their Advisory Committee, and in consultation with the Graduate Program Director.

These core Geology courses *cannot appear on the graduate Program of Study*, nor can they be officially audited. Thus, completion of these prerequisites generally will be accomplished through lecture attendance and the passing of the regular exams in the courses.

PhD Time Line

PhD students who have already completed a MS degree should plan on finishing their PhD program in four years. Maintaining matriculated status (i.e. within the degree program) after five years beyond the Master's is at the discretion of the primary advisor and Graduate Director, based upon satisfactory progress (see section below).

The School of Graduate Studies limits tuition waivers for PhD students to a total of 70 credits, or 4 to 5 academic years, on average.

The School of Graduate Studies has a 8-year limit for PhD degree completion. Beyond this time, one would need to re-apply to the program. Also, after 8 years, coursework is retired, and cannot be utilized towards a degree program unless the courses are recertified.

Graduate student research is commonly funded by agencies that require timely acquisition, analysis and reporting of results. Students who fail to fulfill their funded research obligations in a timely, professional and satisfactory manner may be removed from the overall research project at the discretion of their academic advisor.

The following is a semester-to-yearly timeline that can be used as a guide for completing the Geology PhD degree program in four years:

Geology PhD Timeline

Fall Semester, Year One

- ___ Meet with your advisor often to define a research project.
- ___ Establish dissertation committee, submit Grad School's "Supervisory Committee Approval" form to Grad Director (who will forward it to Graduate School).

Spring Semester, Year One

- ___ Have first dissertation committee meeting at start of semester
- ___ Apply for research grant opportunities, if appropriate.
- ___ Begin writing dissertation proposal draft with advisor mentoring.
- ___ Schedule with the Graduate Director and your advisor, and *complete the Written Comprehensive Examination (Part 1—Breadth) this semester.*

Summer Semester, Year One

- ___ After success in the written (Part 1-Breadth) comps, complete with your committee the "Program of Study for Doctoral Degree" form and submit to Grad Director (who will forward it to Graduate School). Be sure to list your "specialization".
- ___ Conduct initial research while working towards the completion of your dissertation proposal.
- ___ *Apply for residency in the state of Utah if necessary.*

Fall Semester, Year Two

- ___ Have a committee meeting regarding your draft dissertation proposal and to schedule your *Written Comprehensive Examination (Part 2-Depth) early in the semester.*
- ___ After Written Comps are done, *complete your dissertation proposal, and defend it in your Oral Comprehensive Examination*
- ___ With the mentoring of your advisor, apply for research funding opportunities, if necessary and appropriate.

Spring Semester, Year Two

- ___ Revise and get dissertation proposal signed, submit to Grad Director. At this time, the Graduate School's "Application for Candidacy" form is submitted.
- ___ Continue dissertation research in earnest.
- ___ Make a 15-minute oral presentation during the departmental Distinguished Lecture Series or at a professional meeting on your dissertation project. Poster presentations do not count.

Year Three

- ___ Conduct dissertation research, and begin writing dissertation or scientific manuscripts.
- ___ Hold a dissertation committee meeting to appraise progress and gain mentoring.
- ___ Make presentation during the departmental Distinguished Lecture Series or at a professional meeting.
- ___ If in academic specialization, you may instruct an undergraduate course. If in professional specialization, you may seek and conduct an internship.

Year Four

- ___ Complete dissertation research early in this academic year.
- ___ Complete writing of dissertation. Submit refined draft to committee and allow at least 2-4 weeks time for review. When approved, this becomes the "defense copy" of your dissertation.
- ___ With committee signatures, submit "Appointment for Examination" form directly to the School of Graduate Studies. Forms must be submitted 2 weeks prior to the defense date requested.
- ___ Defend dissertation. You must be registered for at least 3 credits the semester that you defend.
- ___ Make defense corrections to thesis. Submit committee-approved (signed) thesis to the School of

Graduate Studies for copy and format editing, along with the "Data and Copyright and Plans for Publication" form.

___ Make Graduate School edits. Submit graduation forms to the School of Graduate Studies.

___ Make final copies of thesis to be bound, and deliver these along with binding fees and forms to the Merrill-Cazier library. Check out the library's checklist regarding this:

<http://library.usu.edu/etd/includes/LibraryRequirementChecklist.pdf>

****Be sure to check the USU Graduate Calendar for important dates related to your graduation****

If Thesis not Complete in Fourth Year

___ If the dissertation is not submitted to Grad Studies and all degree requirements are not completed by the end of the semester following the defense, then the student must register for at least one credit the semester that the final dissertation is submitted. If it is not completed within one year of the defense, it must be re-defended.

___ Continue to make presentations to department or at a professional meeting once per academic year.

___ Matriculated status may be changed to "non-matriculated" after five years, at the discretion of the major advisor and Graduate Director, and based upon satisfactory progress.

PhD Dissertation Committee

Students are strongly encouraged to establish their committees during their first semester, but the dissertation committee must be established no later than the student's second semester on campus. The dissertation committee provides input in the process of course selection, design of the research and the Dissertation proposal, and conducts most of the comprehensive examination process.

In consultation with your advisor, select at least 4 other committee members. Three members total are required to be from within the Geology Department, including emeritus professors. At least one member of your committee is required to be “outside” the Geology Department. These outside committee members may be from other USU departments or from other institutions. If from another institution, they must hold an adjunct appointment in Geology, having been formally approved by the Dean of the College of Science and the Provost office. *See Appendix B for a listing of Adjunct Faculty in our department.*

Faculty must be consulted about serving on the committee and their consent obtained. Complete the “Supervisory Committee Approval” form with all required signatures and submit it to the Graduate Director who will forward the form to the School of Graduate Studies.

No changes in committee membership are permitted within six weeks of the dissertation defense - this is a School of Graduate Studies requirement.

Once dissertation research has been initiated, it is recommended that graduate students meet with their committee once a semester to discuss progress, problems or deviations from the original proposal.

At least one dissertation committee meeting must be held within the regular nine-month academic year. At this meeting, the committee will evaluate progress toward completion of degree requirements. Failure of the graduate student to convene at least one thesis committee meeting within the regular nine-month academic year will be interpreted as a sign of unsatisfactory progress.

PhD Program of Study and Courses

Once a dissertation committee has been approved by the School of Graduate Studies, the graduate student should then meet with the advisor and committee members to determine an initial course of study appropriate for the intended thesis research. After the second semester, when the Written Comprehensive Exam is complete (see below), the student and committee will formally fill out the "Program of Study for Doctoral Degree." This form must be delivered to the Geology Graduate Director who will forward it to the Department Head for signature and then to Graduate Studies.

On the Program of Study form you should write in or select your research specialization. Remember, the Geology plan-A degrees have six specializations: 1) Geomorphology and Quaternary Sciences; 2) Geophysics; 3) Hydrogeology; 4) Petrology and Geochemistry; 5) Sedimentology and Paleocology; and 6) Structure and Tectonics.

PhD students will not be allowed to receive TA support or instate tuition waivers after their third semester unless the Program of Study is signed and filed at the School of Graduate Studies. Exceptions must be appealed at the discretion of the Geology Graduate Director.

The Program of Study represents a contract—stick with it. If you must make changes later during the course of study, the form must be updated for the School of Graduate Studies or you will not be able to graduate. This requires that your advisor and the Geology Grad Director approve the changes and send a memo to the School of Graduate Studies.

Distribution of Credits

The balance of coursework and dissertation research credits in a student's program of study is tailored to each student's needs. This is ultimately the decision of the student's dissertation committee, and is recorded in the Program of Study form for the School of Graduate Studies.

As a general guideline, if an M.S. is completed first, of the 60 credits required, at least 21 credits should be advanced coursework at the 6000-level and above (excluding GEO 6900, 7970, and 7990), with 12 or more at the 7000-level. Avoid having more than 12 credits of coursework numbered below the 6000 level.

If starting from a B.S., of the 90 credits required, at least 30 should be 6000-level and above (excluding Geol 6900, 7970, and 7990), with 12 or more at the 7000-level. No more than 21 credits should be below the 6000 level.

No more than 3 credits of 3000-4999 level courses may be applied toward the degree. These 3000-4999 level credits must be from outside your major area.

You should aim for less than a maximum of 40 Dissertation Research credits (GEO 7970). Beyond that, or beyond 4 years of study, research credits should instead be Continuing Grad Advisement (GEO 7990).

Following USU Grad Studies residency requirements, no more than 12 credits can be transferred from another institution. They must not have been used towards another degree, nor be more than 8 years old.

For utilitarian purposes of filling out a semester's credits only, the department's weekly Distinguished Lecturer Series (GEO 6800, sec. 1) can be taken for 1 credit.

You may not include the credit received for the TA training course (INST 7920) toward your PhD degree program.

Finally, depending upon whether you are undertaking the Academic versus Professional track, you will include GEO 6900 credits for either teaching a course or conducting an industry internship. The number of these credits you receive varies generally from 3-6, at the discretion of the student's committee. *The School of Teacher Education and Leadership (TEAL) and Department of Instructional Technology and Learning Sciences (ITLS) here at USU offer several courses you might find useful for pedagogy and technological training in your Program of Study.*

Registration Requirements

Graduate students using university facilities and/or under faculty supervision must register for a minimum of 3 credits per semester up to and including the semester in which the dissertation is successfully defended. This applies only to the regular academic year, not summer. If a student is not using facilities or faculty time, the Graduate Director may write a request to Graduate Studies verifying this and waiving the 3-credit requirement, but the student will be subject to a \$100 fee per semester. Following the thesis defense, registration policies of the School of Graduate Studies apply.

Appointment as a TA/RA requires 6 to 9 credits per semester until the Program of Study is completed. After that point, the 3-credit minimum enrollment may be satisfied by registering for GEOL 7990, Continuing Graduate Advisement.

Grades and GPA

Only two grades of less than "B" (e.g. B- to C-) will be accepted as part of the required degree program as listed on the Program of Study. The School of Graduate Studies will not accept "D" grades. A 3.0 GPA must be obtained on required course work as listed on the Program of Study. *If you fall below a 3.0 GPA, the School of Graduate Studies will place you on probation, and you cannot receive financial aid or TA funding. You have one semester to raise you GPA and retain matriculated status.*

Dissertation research credits will be graded Pass-Fail only, and are listed as Incomplete each semester they are taken. When your degree program is complete, they are changed to Pass.

Only the Geology Graduate Director can change these thesis-credit incompletes, as their "instructor of record". Before changing the incompletes to Pass, the Graduate Director must see the thesis binding slip from the library, ensure that any departmental equipment checked out and USU keys are returned, and receive affirmation from the major advisor that all products and deliverables are complete.

Ph.D. Comprehensive Examinations

The Geology Department graduate program requires all Ph.D. students to pass both written and oral comprehensive examinations in order to advance to candidacy for the degree. The purpose of these examinations is to ensure that a student is academically prepared to conduct dissertation-level research.

The written comprehensive examination has two parts, which should be administered in a student's second and third semesters at Utah State University so that any deficiencies identified can be addressed in a timely manner by coursework, independent study, or the retaking of all or part of the examination. The written exams should be completed before the research proposal is completed.

The oral comprehensive examination should occur no later than the semester following the completion of both written comprehensive examinations (typically in the second year). The oral exam hinges upon a presentation and defense of the research proposal. Thus the research proposal must be completed and approved by the committee concurrently. Upon successful completion of the oral comprehensive examination, the student officially advances to candidacy for the Ph.D.

Written Comprehensive Examination

The written comprehensive exam format consists of two parts: Part I examines the candidate's breadth of knowledge in the overall Geosciences and is administered largely by the Graduate Director; Part II examines the candidate's depth of knowledge in his or her specialties and is conducted by the student's advisor and committee.

Part I (Breadth) - The format for Part I is a ~8 hour closed-book exam, usually split into more than one day and comprising 5-10 questions. It is the responsibility of the Graduate Director to organize the comprehensive examination and soliciting questions from the faculty in general, such that a reasonable mix of breadth questions are assembled.

To evaluate the Breadth part of the Written Exam, the Graduate Director will recruit 2-3 other faculty to form an examination committee, drawn from the student's dissertation committee. This committee utilizes the "Results of Ph.D. Comprehensive Examination: Written Breadth" form. If the candidate has not demonstrated adequate knowledge of a topic through the examination, the committee may require that specific conditions be met before completion of the examination, such as coursework or the retaking of the examination at a later time. If two or more committee members vote "not pass", the committee may in its summary evaluation vote "not pass", and the student's program will be terminated.

The Breadth Written comps are specifically useful for identifying coursework that is needed, and *any coursework identified as a condition should be included on the subsequent "Program of Study" form, which is completed as soon as possible after the Breadth part of the Written Exam.*

Part II (Depth) - The format for Part II is an open-media, take-home examination, comprising 4-7 major questions or educational tasks, with a time limit of approximately one week at the discretion of the examination committee. The depth questions will be solicited from the candidate's committee members by the Dissertation Committee Chair (primary advisor). These questions are to be used to evaluate the depth of the candidate's knowledge within his or her area of research, and identify any

conditions that need to be met to complete the examination.

The student's dissertation committee members evaluate the Depth part of the Written Exam, recorded using the "Results of Ph.D. Comprehensive Examination: Written Depth" form. Based upon performance, the committee or committee members may chose to vote "conditional pass", and then identify those conditions to be met. If two or more committee members vote "not pass", the committee may in its summary evaluation vote "not pass", and the student's program will be terminated.

Oral Examination and Dissertation Prospectus Presentation

The Ph.D. student will prepare a professional presentation based upon his or her dissertation research proposal, to be given to their examination committee only. This should focus upon their research design, and it may be 1/2 -1 hour in length. Following upon this presentation, the examination committee will ask questions about its content, as well as deep and probing questions about the research topic under consideration.

The specific purpose of the oral comprehensive examination is to ensure the candidate's knowledge of their research area and the soundness of their research proposal and research design. It has the additional purpose of providing an important exercise in professional verbal communication in the sciences, which should be well organized, concise, and rigorous.

The examination committee records its evaluation on the "Results of Ph.D. Comprehensive Examination: Oral" form. If two or more committee members vote "not pass", the committee may in its summary evaluation vote "not pass", and the student's program will be terminated.

Based upon performance in the oral comprehensive exam, the committee or committee members may chose to vote "conditional pass", and then identify those conditions to be met.

Advancing to Candidacy

Once both the written and oral comprehensive exams have been successfully passed (*excluding* any coursework conditions listed on the students Program of Study), and the Dissertation proposal is complete and signed by the committee, then the Graduate School's "Application for Candidacy" form can be filled out. This must be signed by the major advisor and the Geology Department Head.

If you need more motivation...recall that *starting the semester after this form is submitted, the PhD TA/RA stipend is increased by \$1000 per semester!*

PhD Dissertation Proposal

The dissertation proposal should be a major focus of your first three academic semesters. Creation of the research proposal will help you to focus and organize your project, and your dissertation committee will be able to provide input during the writing and review stages of the proposal. It will also serve as important fodder for seeking external funding.

The thesis proposal is a contract of sorts between the student and the committee. By signing the document, all parties agree that the research is of an appropriate nature and the methods described are adequate. This provides a safeguard against excessive additions or changes during the lifetime of the research project.

Yet the project as described in the thesis proposal is not completely cast in stone. Research projects commonly evolve and change and, *if the student and committee are in agreement*, then the originally-outlined project may be modified.

Format

The body of the dissertation research proposal should be similar in scale, style and rigor to an NSF proposal. The identification of an important problem and a research design to address it is fundamental to PhD-level work. The proposal may have on the order of 20 pages of double spaced text, including initial research or analytical findings. In addition, there will be references, tables and figures.

As with most aspects of working on your PhD, communication between you, your advisor, and your thesis committee will help things to go more smoothly.

PhD Dissertation

Format

Obtain the current version of the School of Graduate Studies Publication Guide for their requirements regarding dissertation format.

In consultation with your advisor, choose a geoscience journal whose format you will follow. Geological Society of America publications are our default standard for style, and a style guide is available from them:

<http://geosociety.org/pubs/>

When questions arise regarding style and format, discuss them with the editorial staff in the School of Graduate Studies office. The thesis coordinator offers seminars on writing and formats on a regular basis. Watch for notices.

One new requirement: In addition to a regular scientific abstract for your Thesis, USU now requires a “public abstract” as well. This is a non-technical summary of the work that can be read and understood by non-specialists. This is a skill that is increasingly important in required in the sciences.

Some common rules/mistakes: You may reduce tables and figures but captions must remain full size and have the same size/style of print as the text. All section headings, figure and table captions, and plate titles *must agree verbatim* with the lists of same in the front of the thesis. Only references cited in the text should appear in the list of references. If a reference is important enough to list, it should be cited somewhere in the text.

Role of the Advisor and Dissertation Committee

Frequent communication with your advisor is critical in successfully completing your PhD.

Your advisor and committee should not be used as copy editors for grammar and format. Their role is to evaluate the methods, the logic, synthesis of data and conclusions, but *not* to spend hours correcting style and spelling errors. The more time that they have to spend on editing leaves less time for dealing with the science of your work.

Preliminary drafts should be reviewed by the thesis advisor, not by the entire committee.

Students should be aware that the form and content of a dissertation and the level of expectation by an advisor vary for any number of reasons: different kinds of research problems and methodologies that may be applied, changes in faculty, different abilities of graduate students, access to data, funding, etc.

Once the dissertation draft is in reasonable form, and with the advisor's consent, the draft should then be reviewed by all committee members. *This draft is not the defense copy.*

Upon approving a dissertation draft for defense, committee members, including the advisor, should be allowed at least 2 to 4 weeks for review of the draft *Committee members may refuse to review*

theses when other departmental or professional obligations conflict with a timely review..

Once approved by the committee, this becomes the defense copy. This version will not be returned to the candidate nor will any further changes be made in the document by the candidate until after the defense. Your committee must have the defense copy at least two weeks prior to the defense. If there are photos, large plates or appendices not quite ready for expensive duplication, at least one copy should be made available to the committee for the two-week period prior to the defense.

Defense Preparation

Your dissertation defense is viewed as the last major hurdle on the path to receiving your degree. The length of your public presentation of your research should be about 30 minutes. This leaves time for set up and questions afterwards, while still fitting within the 50-minute classroom timeslot that many attendees will have. There are things that you can do now to help avoid conflict and tension during the last few weeks of writing, revising and defense preparation.

You are responsible for scheduling your defense with the School of Graduate Studies after approval of your advisor and consultation with your committee. Remember that all committee members must have read the dissertation before agreeing to schedule the defense. Scheduling requires paper work and signatures.

There are several reasons to avoid trying to defend in the summer. First, most faculty are on a nine-month contract and they have other responsibilities and obligations during the summer. At the least, this makes it nearly impossible to schedule a summer defense. Secondly, there is an enrollment/financial reason to strictly avoid defenses outside of the regular fall and spring semesters. Having to enroll in the summer in order to defend ends up costing money no one has.

If it is absolutely necessary to defend your Thesis during the summer and/or undertake post-defense revisions, faculty consent must be obtained no later than the end of spring semester.

Multiple copies of dissertations, either defense copies or final versions, should not be run off on Department of Geology printers and photocopiers, unless you pay for them.

Completion of the Degree and Binding

After the dissertation signature page is signed by the committee, the process is turned over to the School of Graduate Studies. Consult their webpage and materials to determine current practices are for scheduling and reviewing dissertations, gaining the Dean of Graduate Studies signature, and graduating.

Before a thesis can be bound, it must be duplicated. In addition to copies you want for yourself, the Department of Geology requires one bound copy, and the USU library requires two. Most thesis advisors request one as well. The plates and figures to be placed in back pockets and fold-out figures embedded in text must also be duplicated and fan-folded to a size appropriate for binding.

Perhaps the last thing you will do as a Geology grad student is complete the Department's "Exit Form for Graduate Students", which is required before your Thesis research grades are submitted.

Monitoring and Evaluation of PhD Student Progress

Review of progress will be an ongoing process, and evidence of satisfactory progress includes: a) your at-least-annual committee meetings and their associated memo from your advisor; b) the completion of the Program of Study; c) dissertation proposal; d) annual presentations; e) success in obtaining grant funding; and f) performance in graduate coursework.

Unsatisfactory progress may be indicated through: a) failure to follow the graduate student time line presented above; b) unsatisfactory GPA and academic probation; c) your rate of progress in coursework; d) lack of thesis committee meetings; d) failure to make satisfactory progress on thesis research.

If unsatisfactory performance is perceived by the thesis research advisor or Graduate Director, the Geology Graduate Director will speak with the student and, if necessary, your committee. The Graduate Director will then write a memo of notification regarding unsatisfactory progress for the student's file and provide the student and advisor with copies.

If, over the semester following the above notification, the student continues to make unsatisfactory progress toward the degree (as determined by the advisor, thesis committee and Geology Graduate Director), the student will be placed in non-matriculated status and the School of Graduate Studies will be notified. This ends the student's participation in the Geology Graduate Program.

UTAH STATE UNIVERSITY, DEPARTMENT OF GEOLOGY
GRADUATE HANDBOOK AND POLICIES

GENERAL DEPARTMENTAL POLICIES

Field and Laboratory Equipment and Policies

Most department equipment may be borrowed by students for their use in field work, research or class activities. They are maintained by either the Instrument Technician or in some cases by individual faculty. *Use must be arranged by first contacting the Instrument Technician, Gary O'Brien (gary.obrien@usu.edu).*

General Field Equipment

Field equipment items include basic Brunton compasses, measuring tapes, shovels and picks, color charts, GPS units, and portable stereoscopes. The Geology Department has a significant store of camping equipment, field cooking equipment, water containers, etc. In general, this equipment comes under the supervision of either the Geology front office staff or the Geology Technician, and must be signed out.

Survey Equipment

Total stations, survey-grade handheld GPS units, high-precision RTK-GPS units are available in the Geology Department. Some of these instruments are utilized by the entire department and for teaching. They are available to be signed-out from the Geology Technician.

Microscopes

Binocular microscopes and petrographic microscopes may be signed out for use in graduate student offices or research labs when not required for use in classes. Additional, related equipment includes light sources, mechanical stages (with or without point-count gears) and a counter bank.

In general, binocular scopes are under the supervision of the paleontologist (Dave Liddell) and petrographic scopes are under the supervision of the igneous petrologist (John Shervais).

Other Minor Equipment

Use of other equipment may be arranged by contacting the Instrument Technician or particular faculty as listed below:

Rock crushers and grinder	Geol 05A	Gary O'Brien
Air abrasive unit	Geol 05A	Dave Liddell
Rock prep area, thin sections	G04-G06	Gary O'Brien
Seismic, resistivity, magnetometer geophysical equipment	Geol G04	Tony Lowry

Major Instruments

All students wishing to use our major instrumentation such as XRD/XRF, ICPMS, Picarro, Malvern Laser, etc. will need to work through Instrument Technician Gary O'Brien. He will also keep track of user time/number of analyses for billing purposes, following the fee schedule below.

Laser particle-size analyzer	Geol 115
X-ray and XRF Lab	Geol 117
ICPMS	Geol 114A
Picarro Carbon isotope analyzer	Geol 115
USU Luminescence Laboratory	Innovation Campus Tammy Rittenour

Instrument Fee Schedule (subject to change)

Categories:

- i) Course use
- ii) Student with limited funding, contributing labor
- iii) Faculty and externally-funded student projects
- iv) Other campus users

XRD

- i) \$10/analysis (charge if course fees available)
- ii) \$10/analysis
- iii) \$60/analysis
- iv) \$90/analysis

XRF

- i) \$10/analysis (charge if course fees available)
- ii) \$10/analysis
- iii) \$100/analysis
- iv) \$150/analysis

ICPMS (additional fees if acid digestion is required)

- i) \$20/analysis (charge if course fees available)
- ii) \$40/analysis
- iii) \$70/analysis
- iv) \$120/analysis

4) Picarro stable isotope

- i) \$3/analysis
- ii) \$3/analysis
- iii) \$5/analysis
- iv) \$10/analysis

5) Malvern laser particle size analyzer:

- i) No fee
- ii) \$5/analysis
- iii) \$20/sample prep and analysis (additional \$5 charge for data reduction and report)
- iv) \$30/sample prep and analysis (additional \$5 charge for data reduction and report)

OSHA Standards

The Department of Geology must comply with OSHA standards in storage and use of all chemicals, including dark-room chemicals, epoxy, hydrochloric acid, alcohol and acetone. Consequently, access to some lab areas is restricted. Safety training and acknowledged receipt of Materials Safety Data Sheets (MSDS) are required in labs using chemicals.

Travel Policies

Forms and Reimbursements

Any person traveling on university-related business must have the proper travel forms completed and submitted to the USU Travel Office.

As soon as you know that you will be traveling, complete a green “Geology Department Travel Request Form”. This form can be obtained from the geology main office. Turn in the completed form to Jean Daddow in the main office.

A pre-trip electronic “Travel Authorization” (TA) will be generated by the office staff. This TA must be submitted and approved before the trip begins.

After the trip is finished, turn in all travel-related receipts and paperwork to Jean. Remember that *all receipts must be itemized* -- a simple credit card receipt will not be adequate for reimbursements!

A post-trip “Expense Report” (TR) will be generated and submitted to the Travel Office. If you have set up an automatic deposit system with the university, any reimbursements due you will be deposited directly into your bank.

Note:

- Airfare, registration, etc., that was paid for personally by the traveler can be reimbursed before the trip with proper receipts (if the TA is submitted early enough).
- Cash advances for students may be done with proper documentation in certain circumstances; again, submit paperwork well in advance of the travel.
- Itemized receipts must be submitted for all reimbursements; all receipts should be in the name of the traveler listed on the TA .
- Meals during travel can be reimbursed as per diem or from actual receipts. Per diem will automatically be used if meal receipts are *not* itemized. If one meal in a given day is from receipts, all meals for that day must be from receipts. Meal reimbursement from receipts should be consistent with per diem rates. Reimbursements cannot cover alcohol.
- Reimbursements are only paid to the main traveler listed on the TA. All expenses incurred during travel should be paid for by the traveler listed on the TA. Verify that hotel receipts, etc. are in the name of the traveler.

Travel Card (T-card)

The Geology Department has a travel-related credit card (T-card) that can be used for university travel-related expenses (e.g., air fare, hotel, conference registration, campground reservations, airport shuttle, Enterprise rental in Logan, etc.) Before you purchase any travel related items, please check with the main office to see if a T-card can be used for the purchase. If the T-card is used, an itemized receipt and a green travel request form must be submitted to Jean.

T-cards can also be used if buying specific travel-related supplies for a field trip, such as propane gas, groceries for field-camp or a grad field trip, etc., but these items must be purchased at a store (e.g., Smiths) but not at a ‘mini-stop’ where the receipt is listed a gas station (e.g., Maverik).

There is only one T-card in the office and it cannot leave the office.

Hotels and rental cars (outside of Logan) may be reserved with the T-card, but the traveler must pay the vendor, obtain an itemized receipt in their name, submit the receipt with the TR, and get reimbursed for the expense.

Vehicles

Students may, at some time, be asked to drive one of the department vehicles (Yukon and Suburban), a vehicle from campus Motor Pool, a rental vehicle from Enterprise in Logan, or their personal vehicle. *No matter which vehicle is driven, anyone driving on University business must complete the state mandated on-line driver training test* (see Jean for details). This is not the same as a State of Utah driver's license!

The university gas card will not work with Enterprise or other rental vehicles. The traveler listed on the TA should personally pay for all fuel, turn in the receipts, and then get reimbursed.

Department vehicles:

- If you are asked to drive one of the department vehicles (Yukon/Suburban), you will be given an envelope with the vehicle keys and gas card. It is your responsibility to make sure that the BEGINNING and ENDING miles are recorded on the vehicle envelope. After the trip, park the vehicle in the appropriate location and return the envelope, key, and gas card promptly to the office.
- Please verify that the vehicles are returned clean and with 3/4 tank of gas (vehicles are coming back empty, dirty and with trash still left in them).
- Report any damage or needed repairs to the main office.
- Department vehicles should be returned to the parking lot north of Nutrition and Food Science. The vehicles can be parked in the University Inn parking lot for only 2 hours at a time, and never overnight.
- Never leave unattended vehicles behind the geology building unless actively loading or unloading (exception field trips which purchase a temporary service permit). Behind the geology building is considered 'service permit' parking 24/7.
- *Parking tickets are the responsibility of the driver, not the department.*
- *The two vehicle gas cards are not interchangeable* – for example, if we use the Yukon gas card for the Suburban, we will lose gas card privileges

A pamphlet with a list of gas stations which accept the university gas card should be in each vehicle. If the gas card does not work at a listed station, the traveler will need to pay for the gas and turn in the receipt for reimbursement (using the gas card will save money!). Please report the name and address of the station listed in the pamphlet where the gas card was not accepted to the geology office for follow-up with Motor Pool.

Keys, Telephones, and Building Security

Geology graduate students are typically issued two keys. One accesses their specific office/lab space at the consent of the major advisor, and another is a sub-master that allows access to the Geology building and the following public-use rooms:

#G04	rock-prep area
#102	teaching lab
#202	teaching lab
#203	Oldham room (study area, computers, mailboxes)
#203A	Documents room (photocopier, plotter)

Geol #101 is accessed via push-button electronic locks. The combination is provided to students on an as-needed basis.

All members of the department with keys (faculty, staff and students) are asked to share in the responsibility for department security. **PLEASE MAKE SURE THAT ALL UNATTENDED RESEARCH LABS AND OFFICES ARE KEPT LOCKED.**

The Oldham room (#203) and the two teaching labs (#102 and #202) will normally be left unlocked from 8 a.m. until 5 p.m. Monday through Friday. All other areas should be left locked when unattended or unoccupied.

Office Hours

Students should observe the posted departmental office hours, which are 8 am to 4 pm Monday thru Friday.

Mailboxes

Each graduate student is assigned a mailbox in the Oldham room (#203). Mail delivered to the department will be distributed to those boxes by the office staff, you can also use this mailbox in your capacities as a Teaching Assistant. Please check your mailbox often.

Geology Office - Use of Supplies and Facilities

The use of facilities and supplies in the Geology Department office is a privilege and not a right. Please note the following:

Office supplies

Office supplies are purchased with state funds and should not be taken for personal use under any circumstances.

To gain office supplies for activities related to your research or teaching duties, please request assistance from the office staff. Students are not allowed access to cupboards, drawers and/or filing cabinets in the main office.

Do not take staplers, scissors, tape dispensers or other office equipment out of the office. These items are maintained for the convenience of all.

Letterhead

Use of letterhead constitutes official departmental correspondence, and it should not be used for any other purpose. Students may use letterhead for research-related or professional-level correspondence. In such cases, obtain letterhead directly from your advisor.

Copier

Graduate students making personal copies can request an individual copier code from the office staff. Charges of 10 and 20 cents per copy, for black-and-white and color, respectively, are billed to you, monthly.

Students making copies for classes for which they are the TA should charge those copies to the appropriate class-fee account, such as Geol 1150, 3550, 3600, etc. Important exceptions are the syllabus and exams for a course, which are charged to a different copy code available from the office staff.

Document Room (Geol #203A) and Geol #138 -- Policies

The Department of Geology maintains a comprehensive collection of geologic and topographic maps, with emphasis on the intermountain west. In addition, we have a collection of USU Geology graduate theses, U.S. Geological Survey publications, various regional field guides and technical reports, and some scientific journals.

These rooms function as a branch of the greater USU library system, and some holdings are Federal Depository holdings and not the property of the Geology Department. *In order to maintain its usefulness as a reference for all, it is critical that maps and volumes be properly reshelved.*

Access and Use

Geol 138 is restricted. Office staff and faculty can access this room for you. The Document Room (203A) is accessed via the department office, and such access is generally restricted to regular office hours.

Use of the maps and volumes is restricted to within the rooms and photocopying, otherwise materials must be signed out to respective graduate student or faculty offices. Ask the front office staff about signing items out. Sign out by the general public or undergraduates is not allowed unless permission is granted by the department head.

There are holdings of duplicate maps available for teaching or research activities, and most documents are available in the USU Library or via Interlibrary Loan.

If you somehow compromise the last copy of a given map or document, please notify the secretary or department head so that replacements may be obtained.

Document Cabinet

Fragile or irreplaceable documents of local interest are locked up in the green document cabinet within Geol 138. Access is restricted to faculty and items in this cabinet should not be removed from the room unless for photocopying.

Computer Facilities - Policies and Procedures

The Department of Geology maintains a bank of computers in the Oldham Room, Geol #203 (the west end of the display and study area). These facilities are not supported by the computer fee collected at registration, but by department funds only. The computers have a fast Ethernet connection and are networked to departmental printers.

Individual faculty members maintain discreet computer facilities for graduate students in their respective research labs. As graduate students, these will be your primary resource beyond your own hardware. *Use of another faculty member's research computers requires their expressed permission.*

Importantly, there are significant student computing facilities elsewhere on campus that you are entitled to use as a consequence of the computer fee collected at registration. Especially those facilities found in the College of Engineering may be useful for your research.

Priority Use

Use of departmental facilities is restricted to Geology undergraduate majors and Geology graduate students. *Other students currently taking Geology courses may use these facilities for Geology course-related work only.*

Priority is given to those students completing Geology course assignments where use of specialized Geology-supported software is required. Students may be asked to relinquish computers if a class is scheduled to use departmental computer facilities.

Maintenance and Use

When the paper supply gets low, see the Geology front office staff for a new supply. Likewise, when the printer toner starts to fade, please request a replacement.

All student users are required to provide their own USB storage. The hard drives on departmental computers are used for the operating system and software only.

You cannot install software on the general access department computers. If there is a program that you need to use, have your thesis advisor pursue having it installed.

If you are having intractable problems with software or computer performance in the Oldham room lab, notify the front office personnel, and they can seek IT help.

UTAH STATE UNIVERSITY, DEPARTMENT OF GEOLOGY
GRADUATE HANDBOOK AND POLICIES

APPENDIX A: DEPARTMENT FORMS

STUDENT EVALUATION OF TEACHING ASSISTANTS (TA)

TA's name: _____ Lab/Course Number _____

Lab day and time: _____ Semester: _____ Year: _____

Please respond to the following questions as they apply to the Teaching Assistant (TA) whose name you have written above. Grade him/her on a scale of 1 to 4, making a circle around the appropriate number.

	poor	fair	good	excellent
1. Does the TA have an understanding of the material taught in the course?	1	2	3	4
2. Does the TA make known the expectations, procedures, and grading policy for the laboratory?	1	2	3	4
3. Are presentations for laboratory exercises and background material clear and helpful?	1	2	3	4
4. Does the TA answer questions clearly?	1	2	3	4
5. Is the TA prepared for laboratory exercises?	1	2	3	4
6. Does the TA invite questions or seem receptive toward receiving questions?	1	2	3	4
7. Is the TA impartial in their instructions with students?	1	2	3	4
8. Does the TA keep order in the class such that all can hear and learn?	1	2	3	4
9. Does the TA grade the exercises and return them to the students promptly?	1	2	3	4

Please include any other comments you wish to make:

DEPARTMENT OF GEOLOGY
 UTAH STATE UNIVERSITY
 RESULTS OF PH.D. COMPREHENSIVE EXAMINATION:
WRITTEN BREADTH

Ph.D. Candidate _____ Date(s) **breadth** examination proctored _____

Track (Academic or Professional) _____

Specialization (Sed&Paleoec, Struct&Tect, Geomorph&Quat Sci, Hydrogeology, Pet&Geochem, or Geophysics) _____

Indicate the scoring by the examination committee members responsible for each specialization, any conditions set by the committee, the overall scoring of the committee, and finally when the Written Breadth Comprehensive Examination is fully completed.

SCORING ON WRITTEN EXAMINATION _____

(Part I-Breadth)

Dissertation Committee Chair _____

Pass	Pass	Cond.	Not
w/com.*		pass	pass

Graduate Director _____

Pass	Pass	Cond.	Not
w/com.		pass	pass

Examination Committee Member _____

Pass	Pass	Cond.	Not
w/com.		pass	pass

Examination Committee Member _____

Pass	Pass	Cond.	Not
w/com.		pass	pass

Summary evaluation of the committee

Pass	Pass	Cond.	Not
w/com.		pass	pass

*with commendation

CONDITIONS REQUIRED, IF ANY, TO PASS EXAMINATION

What additional steps need to be completed by the student to rectify any deficiencies revealed by this examination? These may include, for example, additional course work to appear on the Program of Study form, directed readings, and retaking a portion or all of the examination.

_____	completed (date) _____
_____	completed (date) _____
_____	completed (date) _____
_____	completed (date) _____

Committee member(s) responsible for ensuring that the above steps are completed _____

Student has hereby completed the Part I-Breadth Comprehensive Examination for candidacy in the Department of Geology

Signed (Committee Chair) _____ Date _____

Signed (Graduate Director) _____ Date _____

DEPARTMENT OF GEOLOGY
 UTAH STATE UNIVERSITY
 RESULTS OF PH.D. COMPREHENSIVE EXAMINATION:
WRITTEN DEPTH

Ph.D. Candidate _____ Date(s) **depth** examination proctored _____

Track (Academic or Professional) _____

Specialization (Sed&Paleoec, Struct&Tect, Geomorph&Quat Sci, Hydrogeology, Pet&Geochem, or Geophysics) _____

Indicate the scoring by the examination committee members responsible for each specialization, any conditions set by the committee, the overall scoring of the committee, and finally when the Written Comprehensive Examination is fully completed.

SCORING ON WRITTEN EXAMINATION (by specialization)

(Part II-Depth)

Dissertation Committee Chair _____	Pass	Pass	Cond.	Not
Area of Specialization _____	w/com.		pass	pass
Examination Committee Member _____	Pass	Pass	Cond.	Not
Area of Specialization _____	w/com.		pass	pass
Examination Committee Member _____	Pass	Pass	Cond.	Not
Area of Specialization _____	w/com.		pass	pass
Examination Committee Member _____	Pass	Pass	Cond.	Not
Area of Specialization _____	w/com.		pass	pass
Examination Committee Member _____	Pass	Pass	Cond.	Not
Area of Specialization _____	w/com.		pass	pass

Summary evaluation of the committee

Pass Pass Cond. Not
w/com. pass pass

*with commendation

CONDITIONS REQUIRED, IF ANY, TO PASS EXAMINATION

What additional steps need to be completed by the student to rectify any deficiencies revealed by this examination? These may include, for example, additional course work to appear on the Program of Study form, directed readings, and retaking a portion or all of the examination.

_____	completed (date) _____
_____	completed (date) _____
_____	completed (date) _____
_____	completed (date) _____

Committee member(s) responsible for ensuring that the above steps are completed _____

Student has hereby completed the Ph.D. Written Comprehensive Examination for candidacy in the Department of Geology

Signed (Committee Chair) _____

Date _____

DEPARTMENT OF GEOLOGY
 UTAH STATE UNIVERSITY
 RESULTS OF PH.D. COMPREHENSIVE EXAMINATION:
ORAL

Ph.D. Candidate _____

Date of examination _____

Track (Academic/Professional) _____

Specialization _____

Indicate the scoring by the examination committee members, any conditional set by the committee, the overall scoring of the committee, and finally when the Oral Comprehensive Examination is completed.

SCORING ON ORAL EXAMINATION

(circle one)

Dissertation Committee Chair _____

Pass Pass Cond. Not
 w/com.* pass pass

Examination Committee Member _____

Pass Pass Cond. Not
 w/com. pass pass

Examination Committee Member _____

Pass Pass Cond. Not
 w/com. pass pass

Examination Committee Member _____

Pass Pass Cond. Not
 w/com. pass pass

Examination Committee Member _____

Pass Pass Cond. Not
 w/com. pass pass

Summary evaluation of the committee evaluation

Pass Pass Cond. Not
w/com. pass pass

*with commendation

CONDITIONS REQUIRED, IF ANY, TO PASS EXAMINATION

What additional steps need to be completed by the student to rectify any deficiencies revealed by this examination? These may include, for example, additional modifications to Dissertation research proposal, directed readings, and retaking portions of the examination.

_____	completed (date) _____
_____	completed (date) _____
_____	completed (date) _____
_____	completed (date) _____

Committee member(s) ensuring that the above steps are completed _____

Student has hereby completed the Ph.D. Oral Comprehensive Examination for candidacy in the Department of Geology.

Signed (Committee Chair) _____

Date _____

Exit Form for Graduate Students

Student Name: _____ ID# _____

This form is designed to simplify the many last minute tasks required when students are preparing to graduate. If this form is not completed, final thesis grades will not be issued and a hold may be placed on student transcripts.

Please update:

Forwarding Address _____

Telephone (____) _____ Cell [] Land []

Telephone (____) _____ Cell [] Land []

E-mail _____

Please have the appropriate person (as indicated) initial that the following items have been done:

- | | |
|--|---|
| <input type="checkbox"/> All thesis data, etc. submitted (Thesis Advisor) | <input type="checkbox"/> All university keys returned to facilities office (Office Staff) |
| <input type="checkbox"/> Grad office cleaned (Thesis Advisor) | <input type="checkbox"/> Department deposit (\$25) returned for keys (Office Staff) |
| <input type="checkbox"/> All Department items returned, e.g. Brunton, GPS, Stereoscope, etc. (Instrument Technician) | <input type="checkbox"/> Any personal copies on department copier paid for (Office Staff) |
| <input type="checkbox"/> All library materials returned (Office Staff) | |

Student signature

Date

Joel Pederson, Graduate Program Director

Date

UTAH STATE UNIVERSITY, DEPARTMENT OF GEOLOGY
GRADUATE HANDBOOK AND POLICIES

APPENDIX B: LIST OF ADJUNCT FACULTY IN GEOLOGY

UTAH STATE UNIVERSITY, DEPARTMENT OF GEOLOGY

Adjunct Faculty, Fall 2011

Donald Best, energy consultant, Texas

Janis Boettinger, soils, PSC dept, USU

Alvaar Braathen, structure and reservoirs, University Centre in Svalbard, Norway

Kenneth Carpenter, paleontology, USU-CEU

Bill Doucette, environmental contaminants, CEE dept, USU

Forest Gahn, paleontology, BYU-Idaho

Jagath Kaluarachchi, groundwater, CEE dept, USU

Paul Link, sedimentology and etc., ISU

Jim McCalpin, paleoseismology and geologic hazards consultant, Colorado

Peter Mozley, sed pet and reservoirs, New Mexico Tech

Susannah Porter, paleobiology, UC Santa Barbara

Jack Schmidt, fluvial geomorphology, WATS dept, USU

Doug Schmitt, earth material physics, University of Alberta

David Tarboton, hydrology, CEE dept, USU

Glenn Thackray, Quaternary Geology, ISU

Laird Thompson, energy consultant, California

Adolph Yonkee, structure and tectonics, Weber State University

UTAH STATE UNIVERSITY, DEPARTMENT OF GEOLOGY
GRADUATE HANDBOOK AND POLICIES

**APPENDIX C: CALENDAR OF STUDENT GRANT, SCHOLARSHIP, AND
FELLOWSHIP OPPORTUNITIES**

UTAH STATE UNIVERSITY, DEPARTMENT OF GEOLOGY

Calendar of Grants, Scholarships and Fellowships

October

Sigma Xi

Grants – in – Aid: Due **March 31st** and **October 31st**

<http://www.sigmaxi.org/programs/giar/index.shtml>

November

Environmental Protection Agency (EPA)

STAR Fellowship: due **November 5**

http://www.epa.gov/ncer/rfa/2011/2011_star_gradfellow.html

NSF Graduate Fellowships

Proposals due: **November 19**

<http://www.nsfgrfp.org/>

December

Society for Sedimentary Geology (SEPM)

Student Assistance Grants: Due **December 31st**

<http://www.sepm.org/awards/grantshome.htm>

January

American Association of Petroleum Geologists (AAPG)

Grants – in – Aid: Due **January 31st**

<http://foundation.aapg.org/gia/howto.cfm>

February

Geologic Society of America (GSA)

Research Grants: Due **February 1st**

<http://www.geosociety.org/grants/>

The Tobacco Root Geological Society

Field Scholarship: **February 15th**

<http://www.trgs.org/scholar.htm>

Society of Economic Geology (SEG)

Research Grants and Graduate Fellowships: **February 15th**

<http://www.segweb.org/students/>

USU Ecology Center Student Research Grants

Student Research Grants: due **February 15th** (exact date may change)

<http://www.usu.edu/ecology/htm/graduate-students/awards>

NASA Student Research Programs (look under NSPIRES)

NASA Graduate Student Researchers Program: due **February 1**

<http://fellowships.hq.nasa.gov/gsrp/nav/>

NASA Earth and Space Science Fellowship: due **February 1**

<http://nspires.nasaprs.com/external/solicitations/summary.do?method=init&solId={6803E463-A6EF-3164-F103-A1E4178E430D}&path=open>

NASA Research Opportunities in Space and Earth Science (ROSES)

<http://nspires.nasaprs.com/external/solicitations/summary.do?method=init&solId={9636473D-602B-F49F-ABDC-5A26F36D08CD}&path=open>

March

Society of Exploration Geophysicists

Scholarships: Due **March 1st**

http://www.seg.org/SEGportalWEBproject/portals/SEG_Online.portal;jsessionid=MfnPLLTb2TSMpytbsCxfNxbcCPzRpkGTwByb7MN15qDR5pcjvx3!1825086563?_nfpb=true&_pageLabel=pg_gen_content&Doc_Url=prod/SEG-Foundation/Foundation-Scholarship-Program/scholarship.htm

Rocky Mountain Assoc of Geologists

Norman H. Foster Scholarship: Due **March 1st**

<http://www.rmag.org/foundation/index.asp>

Evolving Earth Foundation

Research Grants: Due **March 1st**

<http://www.evolvingearth.org/evolvingearthgrants/grantsmain.htm>

Wyoming Geological Association

Scholarships and Fellowships: **March 12th**

<http://www.wyogeo.org/scholarships.htm>

USU Department of Geology!

Grad scholarships and awards: due **mid-late March**

use application available on dept webpage, or from Tom Lachmar

SEPM Rocky Mountain Section

Research Grants: **March 19th**

<http://rmssepm.org/scholarships.shtml>

The GDL Foundation

Scholarships and Fellowships: Due **March 26th**

<http://www.gdlfoundation.org/ftp.gdlfoundation.org/Home.html>

Sigma Xi

Grants – in – Aid: Due **March 31st and October 31st**

<http://www.sigmaxi.org/programs/giar/index.shtml>

DOSECC

Student Grants, Due March 1,

http://www.dosecc.org/html/internship_grant_program.html

National Speleological Society, Due late March, Ralph Stone Student Grant

<http://www.caves.org/committee/rac/ralphstone.html>

Research grants: <http://www.caves.org/committee/rac/researchgrants.html>

Shipton-Tilman Grants – for exploration in remote areas, with respect to native people, and without significant support of porters, trucks, etc.
http://www.gore-tex.com/remote/Satellite?c=fabrics_content_c&cid=1148660729549&pagename=goretex_en_US%2Ffabrics_content_c%2FDetail

April

Seely-Hinckley grad scholarships (USU-grad studies)
Due from College of Science to SGS **April 15th**
<http://www.usu.edu/graduateschool/finances/scholarships.cfm>

Society of Petrophysicists and Well Log Analysts (SPWLA)
Scholarships and Grants: Due **April 1st**
<http://www.spwla.org/>

Rocky Mountain Assoc of Geologists
Babcock Scholarship: **Due April 2nd**
<http://www.rmag.org/foundation/index.asp>

Colorado Scientific Society
Research Grants: Due **April 5th**
<http://www.coloscisoc.org/grants/grants.html>

Four Corners Geological Society
Graduate Grants: **April 15th**
<http://www.fourcornersgeologicalsociety.org/foundation/index.asp>

May

SEPM-Gulf Coast Section, Ed Picou Fellowship Grant
for research related to petroleum geology, not necessarily in Gulf Coast
Due **May 1st**
http://www.gcssepm.org/scholarships/picou_grant.htm

The Society of Organic Petrology (TSOP)
Research Grants: **May 15th**
<http://www.tsop.org/grants.htm>

Other Scholarship opportunities:

DOE: <http://www.scied.science.doe.gov/SCGF.html>

American Geological Institute minority Participation Program
<http://www.agiweb.org/mpp/application.html>

Veterans and families of veterans: <http://www.gibill.va.gov/>

Association of Women Geoscientist: <http://www.awg.org/index.html>
Also AWG Salt Lake Chapter Student Travel Award

UTAH STATE UNIVERSITY, DEPARTMENT OF GEOLOGY
GRADUATE HANDBOOK AND POLICIES

APPENDIX D: DEPARTMENT SAFETY MANUAL

Table of Contents

Introduction and Disclaimer

Travel Instructions and Guidelines

-Driving and Vehicle Safety

-Vehicle Fire Safety

Field Safety Policy and Information

Safety Equipment You Should Take to the Field

Field Safety Checklist

What Should Be in Your Daypack Doing Field Geology in Utah

Survival Kit That Weighs About a Pound

Some Outdoor Injury Facts

Having the Right Mental Attitude

Specific Situations: allergies, animals, lightning, heat, cold, and much more

Participant Acknowledgement Form

Field Research Safety Plan (Template)

Are accidents really accidents?

Studies show that in almost every “accident”, human mistakes, whether made at the moment of the incident or days or weeks before, were a major contributor.

Studies also show that proper attitude, training, and gear make a difference in reducing field accident rates and severity.

Utah State University Geology Department

INTRODUCTION AND DISCLAIMER

These procedures and policies are in place for three reasons. First, it is the right thing to do. Ensuring the safety of all in our department and those who work with us is of paramount importance. Secondly, field work and recreation are more enjoyable when there are no safety incidents; a field trip is considerably less pleasant if ended with a trip to the emergency room. Third, all industries, state and federal agencies, and most field-based organizations have mandatory safety policies and procedures, and safety should be part of any workplace culture. Starting now will help you begin developing the ethic of safe practices.

Geological fieldwork involves some level of risk; one part of this may come from chance events that are unpredictable and little can be done about it. Another part of the risk, however, can be greatly reduced by awareness of hazards and good judgment based on experience. Persons undertaking field work must assess the risk, as far as possible, and this will vary in accordance with weather, topography and other conditions on the day and the experience, age, fitness and other characteristics of the people doing the work. No person is advised or recommended here to undertake geological field work in any way that might place them in unreasonable risk from cliffs, ledges, rocks, sea or other causes. Individuals and leaders should carefully consider the safety aspects on the occasion of their visit and in bad conditions be prepared to cancel or modify part or all of the field trip as is necessary for safety. Appropriate safety and first-aid equipment should be taken, and, ideally, mobile phones should be available. Permission should be sought for entry into private land and clearly no damage should take place. Attention should be paid to weather warnings, local warnings and danger signs. No liability for death, injury, damage to, or loss of property in connection with a field trip is accepted by providing this information.

TRAVEL INSTRUCTIONS AND GUIDELINES

We will abide by all USU and state rules and regulations. Please see

Driving and Vehicle Safety

- Seat belts save lives. Everyone must be buckled before the vehicle moves.
- Only authorized drivers will drive USU vehicles.
- We will NOT drive past 11 pm, unless we are very close to Logan. IF we end up in a situation in which late driving is anticipated, the department will pay for hotels, food, etc. to enable people to sleep.
- Drivers should not drive more than ~ 2 hrs without a break.
- Ensure that there is a passenger list in the vehicle.
- Always check to make sure that all passengers are present before leaving a field trip stop.
- NO alcohol is to be transported in state vehicles.
- NO ONE may drink and drive.
- WE WILL obey the speed limits, and drive according to the weather, road conditions, etc.

- NO use of cell phones while driving.
- NO texting while driving.
- Park the vehicles away from any potential source of fire, such as dry grass.
- All participants and drivers should identify who has keys before we go out into the field.
- We will often be in areas where cell phone coverage is spotty or non-existent. We will try to determine where coverage occurs and have emergency plans based on this.
- NO one should take a vehicle without consent of an instructor, or without communicating a plan to the instructor; THE ONLY exception is in the case of an emergency
- One of the most frequent driving issues that occur in field classes are small incidents in parking lots, campgrounds, etc. These can be avoided by having other people watch for obstacles, people, and other vehicles, particularly when backing up.

Vehicle Fire Safety: *If there is a vehicle fire, what should I do?*

- Get yourself and all others out of and away from the vehicle. Be aware of traffic and pedestrian activity and warn them away from the vehicle.
- DO not try to save equipment or personal belongings, just get out.
- If there is a fire extinguisher in the vehicle, take it with you as you exit the vehicle. Even if you cannot use the fire extinguisher, it may be useful to emergency responders that arrive on scene.
- Never put yourself in danger using a fire extinguisher.
- Fire extinguishers must be appropriate for the type of fire.
- Only trained persons should try to control a fire. *Do not attempt to use a fire extinguisher unless you have been properly trained to do so.*
- If you use a fire extinguisher, follow the procedures given during your training and only do so from a safe distance and always have a means to get away.
- After you are a safe distance from the vehicle, call 9-1-1 or the local emergency telephone number. Tell them the location of the fire and follow the instructions of the dispatcher.
- Remain away from the vehicle: *do not attempt to get back into a burning vehicle to retrieve personal property.*
- Do not open the hood or trunk if you suspect a fire under it. Air could rush in, enlarging the fire, leading to injury.

The dangers of motor vehicle fires are often overlooked. Each year, these fires kill over 600 people and injure thousands more.

Utah State University Geology Department

FIELD SAFETY POLICY AND INFORMATION

It is essential that every effort be made to reduce our exposure to risk. As a reminder, the USU General Catalog states:

Assumption of Risk

All classes, programs, and extracurricular activities within the University involve some risk, and certain ones involve travel. The University provides opportunities to participate in these programs on a voluntary basis. Therefore, students should not participate in them if they do not care to assume the risks. Students can ask the respective program leaders/sponsors about the possible risks a program may generate, and if students are not willing to assume the risks, they should not select that program. By voluntarily participating in classes, programs, and extracurricular activities, a student does so at his or her own risk. General information about University Risk Management policies, insurance coverage, vehicle use policies, and risk management forms can be found at: <http://www.usu.edu/riskmgmt/>

NOTE: IF AT ANY TIME ANY behavior on the part of ANYONE in or teaching the class poses a level of risk that you are not comfortable with, you have the right to bring this behavior to the attention of the instructor.

**SAFETY IN THE FIELD IS EVERYONE'S RESPONSIBILITY.
STUDENTS ARE EXPECTED TO ACT RESPONSIBLY AT ALL TIMES.**

Potential Sources of Risk and Procedures

The following is a list of procedures and risks associated with field geology. This list is not all encompassing, but it represents our best estimate of potential issues. It encompasses driving, field work, environmental, and food risks.

1. **Safety comes first.** No project or data is worth your life. The question, "Can I do this safely?" should always be foremost in your mind. If you have any doubts, STOP immediately, evaluate the situation, and then determine a safe procedure. If none exists, do not continue the project or work. Return home and discuss the project and safety concerns with your supervisor.
2. **Field safety training.** All participants are required to read and understand the USU Field Safety Policy and materials.
3. **Plan for safety before you go into the field.** Think about the terrain (cliffs, sand, deserts, fast water, slot canyons, etc.), environment (plants and animals), season (hot, cold, rain, snow, etc.), roads and trails (how will I get out if a road washes out?); will the roads become impassable if it rains?), and your own physical condition and health. Check the weather forecast – how cold will it get at night at the elevations where I will be working? Is rain or snow possible? How far away will I be from my vehicle? Consider all these factors, and then make sure that you have adequate training and skills to handle any situation that might arise. Read manuals and information on the area and hazards. Decide how you will respond and what gear you might need. Check your safety gear

before you go into the field. Prepare for the worst weather and conditions you might encounter.

4. **Discuss safety concerns with your supervisor.** If you are concerned about any situation you might encounter, or feel that you do not have adequate training or experience, discuss your concerns with your supervisor before you go into the field.

5. **Safety procedure when in a group.** Most trips will be conducted in a group setting.

a. Remember to be aware of where other students are at all times. **AVOID CLIMBING** above other students, or on any outcrop that provides a large potential of hazards.

b. Field groups will be assigned for both learning and safety. Please be aware of where your group members are at all times.

c. Do **NOT** go out of sight for long periods of time. Instructors continually count heads, and if we cannot find you, we will begin to look for you.

d. We will not tolerate risky behavior in the field. Any willful behavior that endangers oneself or other students is cause for the student to be sent home at his/her own expense. The student field trip policy that all students must sign prior to travel requires that students acknowledge this policy.

e. Water, first aid equipment, and some emergency supplies will be placed in each field vehicle, and for most of the class, vehicles will be left open so that these items are immediately accessible.

f. When camping overnight, establish a common base camp for all groups. Also, attempt to camp as close to habitation as possible.

g. Have a good sense, without invading privacy, of the abilities of everyone in your group. Are there people who are out of shape? From lower elevations? Overweight? Any health issues?

6. **Working ALONE in the field requires extra precautions. Designate an adult Contact Person before working alone in the field. Working alone should be avoided if possible.** There is no such thing in life as a totally risk-free situation and it is astonishing how easy it is to become incapacitated e.g. by a badly twisted ankle, even in apparently "safe" countryside. If another person is present, it is extremely rare for such incidents to become potentially dangerous. Your contact should be a reliable adult (your spouse, colleague, or a good friend) who will monitor your status in the field, who you will contact frequently while in the field to assure them of your safety, and who will initiate a search if one is needed. In any case, Geology faculty will act as the contact if needed. **NEVER** leave without leaving word with someone.

a. **BEFORE** leaving for the field, **WRITE OUT** a clear action plan (verbal information is seldom reliable when someone is worried or upset). Decide together each step or procedure each of you will follow – and when. Be clear on details. **Uncertainty leads to inaction** – if your contact person is unsure of your intent, location, or check-in time, he/she will hesitate to initiate a search. Your plan should include:

i. Where you are working. Be as precise as you can. Leave an accurate detailed map. Leave GPS coordinates if possible.

ii. Give the contact person all possible information on how they can locate you while you are in the field (your cell number, motel info, etc.) and the name and phone number of the USU main office and your supervisor.

iii. A specific time when you will check in with the contact person. For

example: Some geologists will call home each evening before 10 p.m. If you will be camping or otherwise outside of phone range, tell the person when you will be able to contact them again.

iv. A specific time when the support person should initiate a search. This should be several hours after the initial check-in time to leave a buffer for a broken-down vehicle, dead cell-phone batteries, or some other non-serious problem – you do not want your contact person calling the sheriff for minor problems. For example: your contact person could initiate a search if you have not checked in by 12:00 o'clock (noon) the day after you fail to check in. Many field geologists agree that noon is the ideal time for your contact person to initiate a search. It gives you time to get yourself out of non-life-threatening fixes in the daylight, and to check in. But it still gives the sheriff's office time to mobilize a search with enough daylight left to have a chance of finding you. Psychologically, it is much easier for an injured person to survive if they know that help is on the way.

v. The steps your contact person will follow if you do not check in by the agreed upon time. For example: (1) Call the nearest land manager, etc. where you are staying – have them look for a vehicle (2) Call the main office or your supervisor to see if they have any information (generally this will be near the middle of the day on a weekday). (3) Finally, if the contact person cannot contact you or the USU supervisor, they should call the sheriff of the county in which you are working and give them all the information they can. From that point the county sheriff will decide how to respond.

c. Follow your plan! Check in with your contact person daily. If you forget to check in, you will probably have a Sheriff's Search and Rescue Team looking for you.

7. Do not work alone in high-risk situations. A buddy system is not required for normal backcountry fieldwork. However, some situations do require a field companion. These include: work involving boats or travel on or next to deep water, work in any areas with known or suspected higher-than-normal crime rates, work in unusually remote locations, work in very hot or very cold weather, and work that requires technical climbing, rappelling, or very steep terrain and any other work with higher-than-normal risk (additional safety training or skills verification may be required). The companion does not have to be another geologist; instead, they just need to be an adult that can help you in case of a high-risk situation. The field worker should determine if any such risks exist and discuss any concerns or requests for a field companion with his/her supervisor. **When working alone, double your margin of safety.**

8. FIELD WORK IS NOT AN EXTREME SPORT! Have a safe attitude. We live in a society where people are encouraged to "push the limits." A risk-taking attitude is probably the single largest contributing factor in most accidents. This attitude leads directly to injuries and deaths. Get rid of this attitude before you go.

9. Choose the safe option. Yes, it may take longer, but hike around the cliff rather than trying to climb over it. Hike up the stream bank to a better crossing rather than crossing in fast water. Do not venture out on steep slopes above cliffs. When lightning threatens – head down and to shelter immediately. Do not try to accomplish "one more task" before it gets dark.

10. **Always be prepared to keep yourself alive overnight.** If you are out alone (sometimes even in a group) and incur any kind of problem – lost, broken leg, trapped on a cliff, severe illness, etc. – it is almost certain that you are going to have to spend the night out. Many poorly prepared people have died in the first night from exposure. When wet and/or injured hypothermia becomes a very real danger at moderate temperatures.

11. **Carry appropriate gear.** Carry everything you need to assure your own safety and survival (see separate lists). When hiking away from vehicles, carry a personal Survival Kit. You can make up a good kit that weighs about 1 pound that could keep you alive in many situations (see separate list). Practice using the items ahead of time – can you really build a fire when it's raining, you are shaking, and your hands are ice cold?

12. **Carry a cell phone, satellite phone, or personal locator beacon.** Know how and when to use it. Make sure it is fully charged. If a regular cell phone, know where it will be within range, and where it will not be. At least one member of any field group should have one of these three items, and know how to use them. Remember, once activated, a personal locator beacon signal cannot be retracted, so a search will be initiated – activate it only in a true emergency (but if it is an emergency, don't hesitate – waiting too long may cost lives).

13. **Carry extra water and purification tablets.** When hiking away from vehicles, carry enough water to survive for 2 or more days. Always arrive back at your vehicle with water left in your bottle. Always keep extra water in your vehicle – 1 or more gallons per person depending on the situation and season of the year. Carry a few purification tablets in your survival kit. Know where to find water in your field area.

14. **Carry a first aid kit.** Know how to use it. Take first aid and CPR training and refresher courses regularly. Consider taking wilderness first aid training. The first aid kit should contain a large trauma bandage. Know how to use these products.

15. **Carry safety gear.** The following safety items: pepper spray (can help against bears, cougars, or aggressive people), first aid kit with added trauma bandage, and emergency mylar blanket can be extremely helpful when in the field. The participant should take these to the field, especially on all hikes away from the vehicle, and provide additional personal safety gear needed for each field situation.

16. **Wear and carry proper clothing.** Each participant is required to provide all needed apparel (field clothing, coats, hats, gloves, boots, waterproof outerwear) that is appropriate for any weather or situation the participant could encounter. Purchase high-quality apparel from a reputable supplier. Assure that all apparel is tested and recommended by the manufacturer for the situations you could encounter – the field is not the proper place to find out that your “waterproof” jacket is really not waterproof.

a. Wear a safety helmet (preferably with a chinstrap) when visiting old quarries, cliffs, caves, scree slopes, etc., or wherever there is a risk from falling objects. It is obligatory to do so when visiting working quarries, mines and building sites.

b. Wear safety goggles (or safety glasses with plastic lenses) for protection against flying splinters when hammering rocks or chisels.

c. Don't use one geological hammer as a chisel and hammer it with another; use only a soft steel chisel.

17. Keep yourself physically fit. Know your own health and your own limitations. This is another of the main factors in many outdoor injuries and deaths. The problem started because of poor personal physical condition. For example: weak heart led to heart attack, poor fitness prevented hiking as far as planned, fatigue led to poor judgment, poor conditioning led to severe illness, bad knees or ankles led to slips and falls, etc.

18. Leave a margin of safety. For example: leave an extra hour of daylight to get back to your vehicle; leave high ridges before the thunderstorm gets there; do not climb up a ledge or cliff just because you “think you can make it.”

19. Hunting safety. While the large majority of hunters are safe and responsible, a small number are not. The highest risk is during rifle deer season when the most hunters are in the field with long-range rifles. Seasons vary significantly across the region – determine if hunting season is open in the area you will be working. If possible, avoid going to the field during open rifle seasons. If you do need to go to the field, wear “hunter orange” clothing – at least a vest and hat – while outside of your vehicle. Avoid areas where hunters tend to concentrate. Be respectful of hunters by: 1- talking to hunters in the area – ask them where they plan to hunt and to be aware that you are in the area; 2- avoid their “focus” areas – game trails, watering holes, open meadows, etc. – hunters often spend several hours setting up a hunt and one person walking through the area can ruin all their work; 3- in short, do not interfere with the hunt (regardless of your personal views) – an irritated hunter is not a good thing.

20. Water safety.

- a. Stream crossings, when necessary, should be executed with the utmost care. If water craft are used, personal flotation devices (pfd's) **MUST** be worn.
- b. Obtain local information about tides and currents. Pay particular attention to tidal range. For sea cliffs, local advice can be obtained from HM Coastguards. Always wear footwear when wading in rivers, lagoons or on the shore.
- c. Take special precautions when working offshore. Small boats should normally be used only with an experienced boatman or colleague.

21. Creature Safety. Avoid all contact with animals, insects, and other creatures. NO snake playing!!

22. Food Safety. Attempt to keep a clean and sanitary food preparation area for safety. However, there are always risks associated with food.

23. Environmental Safety.

- a. Take special care near the edges of cliffs and quarries, or any other steep or sheer faces, particularly in gusting winds. Ensure that rocks above are safe before venturing below. Quarries with rock faces loosened by explosives are especially dangerous.
- b. Avoid working under an unstable overhang.
- c. Avoid loosening rocks on steep slopes.
- d. Do not work directly above or below another person.
- e. Never roll rocks down slopes or over cliffs for amusement.
- f. Do not run down steep slopes.
- g. Beware of landslides and mudflows occurring on clay cliffs and in clay-pits, or rock falls from any cliffs.
- h. Avoid touching any machinery or equipment in quarries, mines or building

sites.

- i. Never pick up explosives, or detonators from rock piles; if found, inform the management immediately.
- j. More accidents to geologists, including fatalities, occur along rocky shorelines than anywhere else.
- k. Do not enter old mine workings or cave systems unless it has been approved as an essential part of the work. Only do so then by arrangement, with proper lighting and headgear, and never alone. Ensure that someone on the surface knows your location and expected time of return. Be sure to report after returning.
- l. Rock-climbing, caving and scuba diving may be useful in research activities, but are dangerous for the untrained or ill equipped. They should only be undertaken with the prior approval of the supervisor.

24. Environmental Consideration. Please do not disturb the environment more than is absolutely necessary.

- a. Do not collect specimens unless required for serious study.
- b. Do not hammer outcrops casually or indiscriminately.
- c. Do not disturb living plants or animals.
- d. Do not leave litter, including rock chippings.
- e. Observe conservation requirements.

25. DRIVING – THE BIGGEST RISK! Statistically, driving and riding in a vehicle are the highest-risk part of fieldwork. Follow all state and USU rules. Do not drive while fatigued or distracted. If you are tired after a long day in the field, it is better to camp or get a motel room than make a long drive home. If you are unsure of your driving skills on rough mountain and desert roads, discuss the situation with your supervisor before going into the field. Be alert to changing weather conditions that could turn a dry road into a dangerous situation. **See “Travel Instructions” Section for more information.**

26. When working in groups, have a plan for keys for vehicles. If a part of your group needs to drive out, hiding keys near the vehicle avoids losing time finding the person with the keys.

- a. Get phone numbers of team members.
- b. Make a Google map of the nearest hospitals.

27. For classes, it is strongly recommended that everyone wear safety color vests or shirts.

NOTE: Many tasks and projects require additional safety procedures not covered by this manual. These include: (1) underground work in mines, caves, or tunnels; (2) work in trenches, near open-pit mines, on mine tailings, and on or near other human-made structures or deposits; (3) work on or near drill, construction, and other active work areas; (4) work involving many types of motorized or manually operated equipment; (5) use of ATVs; and (6) operating motor vehicles. Discuss these situations with your supervisor, and obtain appropriate training BEFORE working on projects or entering sites involving any of these types of situations.

SAFETY EQUIPMENT YOU SHOULD TAKE TO THE FIELD

In your daypack:

- 1-safe attitude
- 2- cell phone or satellite phone or personal locator beacon w/ manual
- 3- trauma bandage
- 4- emergency mylar blanket/sleeping bag
- 5- aspirin
- 7- water purification tablets
- 8- insect bite ointment
- 9- pepper spray (can help against bears, cougars, or aggressive people)
- 10- personal first aid kit (see "First Aid Kit" for more information)
- 11- personal survival kit (see "Survival Kit that Weighs About a Pound")
- 12-proper clothing, boots, outerwear for worst possible weather
- 13-water and food
- 14 Simple first aid kit

In the car:

- 1- shovel (large)
- 2- small hand ax
- 3- tow strap
- 4- jumper cables
- 5- 3 types pliers
- 6- 1 – 6-way screwdriver
- 7- two emergency reflective mylar sleeping bags
- 8- first aid kit with supplies, booklet, knife, etc.(see "First Aid Kit")

Also – ALWAYS check vehicle, jack, jack handle, lug wrench, spare tire

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FIELD SAFETY CHECKLIST

Complete Before Each Trip to the Field
Modify According to Own Needs

- Studied Field Safety Policy and Information Manual
- Did a safety evaluation of this project or trip to the field – what are the risks?
- Prepared for hazards/risks I could encounter on this trip
- Completed USU Travel Information Form; leave in Geology Dept. Office.
- Made a written emergency plan with my adult Contact Person
- Have cell phone or satellite phone or personal locator beacon
- Have personal first aid kit (and checked contents)
- Have personal survival kit (and checked contents)
- Have vehicle kit (and checked contents)
- Have good personal field clothing
- Have proper weather-appropriate outerwear and boots
- Have medications or other personal needs
- Did personal check of field vehicle:
 - o tires in good condition, check air
 - o jack, jack handle, lug wrench, spare tire has air and good tread

Some possible risks to plan for (take time to read/research about how you could handle or prepare for these situations):

- driving safety to/from/in field
- fatigue
- driving back country roads
- heat related concerns
- cold related concerns
- drinking water needs
- lightning
- weather changes
- cliffs, steep slopes, ledges
- deep or fast water
- bears, cougars, moose, etc
- insects – allergic reaction
- insects – diseases
- snakes, scorpions, etc
- poisonous plants
- illness/food poisoning
- altitude sickness

- lost, delayed
- surviving overnight if caught in outdoors
- falls, sprains, breaks
- personal health (heart, knees, back, etc)

Human encounters:

- verbal confrontations
- assault/aggression
- robbery/car jacking
- stumbling upon crime
- hidden drug crops

First Aid Kit

It is essential that participants take first aid kits with them in the field. There should be a portable kit as well as one with extra supplies in the vehicles. A traditional kit will include the following¹:

- 2 absorbent compress dressings (5 x 9 inches)
- 25 adhesive bandages (assorted sizes)
- 1 adhesive cloth tape (10 yards x 1 inch)
- 5 antibiotic ointment packets (approximately 1 gram)
- 5 antiseptic wipe packets
- 1 blanket (space blanket)
- 1 breathing barrier (with one-way valve)
- 1 instant cold compress
- 2 pair of nonlatex gloves (size: large)
- 2 hydrocortisone ointment packets (approximately 1 gram each)
- Scissors
- 1 roller bandage (3 inches wide)
- 1 roller bandage (4 inches wide)
- 5 sterile gauze pads (3 x 3 inches)
- 5 sterile gauze pads (4 x 4 inches)
- Oral thermometer (non-mercury/nonglass)
- 2 triangular bandages
- Tweezers
- First aid instruction booklet

It should also include the following non-prescription drugs:

- Aspirin or non-aspirin pain reliever
- Anti-diarrhea medication
- Antacid
- Syrup of Ipecac (to induce vomiting if advised by Poison Control Center)

What Should Be in Your Daypack When Doing Field Geology in Utah

1. Survival kit – put in a small nylon or ziplock bag. Make sure it is always in your backpack. Replenish it as needed. Everything in a good kit can weight under 1 pound (see separate list).
2. First aid kit with trauma bandages.
3. Water -- 2 quarts per day on cool fall days; 3-5 or more quarts per day on hot summer days. Depending on location, also consider: water filter, purification tablets. Never arrive back at the car with an empty water bottle.
4. Detailed map. Review it before you need it.
5. GPS (Never rely on a GPS unit as my only means of finding my way). If you do rely on a GPS, make sure you have extra batteries.
6. Compass. I like to keep a small one in my survival kit just in case I'm not carrying my Brunton compass that day.
7. Waterproof headlamp and extra batteries. A headlamp is much better than a flashlight because it leaves your hands free. Should be good quality. Batteries in LED

¹ As recommended by the American Red Cross.

lights last much longer, but the beam range is limited.

8. Extra food. About 1000 - 2000 calories in high-energy bars, candy bars, etc.

9. Clothes and outerwear for the worst weather you might encounter if you get caught out overnight. Be prepared for rain, sleet, snow, wind, or severe cold. Make sure all clothes are high-quality synthetic fiber that insulate even when wet; DO NOT wear cotton. COTTON KILLS! Depending upon conditions, consider:

- a. Warm hat is a must, even in summer
- b. Sun hat that protects face, neck, and ears
- c. Warm gloves
- d. Dry warm socks
- e. Thermal underwear (high-tech synthetic fabric is lightweight, compact, and very warm for size)
- f. Waterproof coat and pants; GoreTex or other breathable waterproof fabric
- g. Fleece jacket and pants
- h. Rain hat
- i. Rain coat and pants; or poncho
- j. Small first aid instruction booklet

Also consider:

1. Safety glasses (we are geologists who break rocks)
2. Extra prescription glasses
3. Special medicines or needs; for example: allergy "epi" pen
4. Sunglasses
5. Sunscreen and lipscreen
6. Insect repellent and/or headnet
7. Toiletries
8. Sanitary handwipes or antibiotic waterless hand cleaner

Final Note: None of this does much good without training and common sense.

Grant Willis, Utah Geological Survey, March 8, 2005; Compiled from: Mountaineering Club literature; Backpacker Magazine; Boy Scouts of America Fieldbook; Colorado Geological Survey Rocktalk; Planning for Field Safety (AGI); Camping and Wilderness Survival (Paul Tawrell); and many web sites.

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SURVIVAL KIT THAT WEIGHTS ABOUT A POUND

(compiled from many sources by Grant Willis, Utah Geological Survey, March 7, 2005)

Keep in a small nylon or Ziplock bag. Make sure it is always in your backpack. Replenish often. Together, everything here can weight about a pound.

- a. Mylar emergency sleeping bag. Like the standard "emergency blanket" but shaped like a sleeping bag, making it easier to seal out cold breezes.
- b. Wind and waterproof matches. The best ones are from REI and burn even in a strong wind. Seal in a waterproof container. Make sure the striker is included. A magnesium stick is a reliable fire starter, but they take a lot of work and are difficult to use when your hands are cold.
- c. Fire starter. Several kinds are available or make your own. Try them out and find the one you like the best.
- d. Multi-function pocket knife. Small but good quality. Leatherman or Swiss Army knife. Not a cheapo version.
- e. Compass. Make sure North is easy to read. The DNR Bookstore has a small compass with a thermometer attached.
- f. Flashlight. One of the tiny LED lights is a good backup to the larger headlamp that you should have in your backpack. Make sure the ON button is protected from accidental pressure.
- g. Loud whistle. This may have saved the life of the Boy Scout that died in the Uinta Mountains a few years ago. Nobody can yell for very long. A good one has a tone that carries a long distance.
- h. A few heavy-duty Ziplock bags. For emergency water, to keep hands dry, etc.
- i. A large sheet of heavy-duty aluminum foil. Can form an emergency cup or a small pan to heat water over coals (do not use over hot flame).
- j. Small length of sturdy cord.
- k. Small roll of duct or adhesive tape.
- l. Large sheet of fluorescent orange plastic.
- m. Small amount of high-energy food or candy. Coffee, tea, or bouillon packets are good for making a hot drink that also restores salt and gives a psychological boost.
- n. Water purification tablets.
- o. Small reflective signal mirror.
- p. Paper and pencil stub.
- q. A few sanitary hand wipes.
- r. Elastic ace bandage. Can give a sprained ankle enough support to walk out, or secure an emergency splint or bandage.

Also consider:

- s. Small wire pocket saw (helps when gathering wood in emergency).
- t. Large garbage bags (emergency rain poncho or shelter).
- u. Big and small needle and strong thread (dental floss works as a strong light thread for repairing equipment).
- v. Wire.
- w. Safety pins.
- x. Candle.
- y. Mole skin or other blister preventative.
- z. QuikClot (high tech powder to stop severe bleeding).
- aa. Small Sterno can or other micro-stove with fuel.
- bb. Map of work area.

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SOME OUTDOOR INJURY FACTS

Field work is relatively safe

- For example, in a 2003 report, England reported that out of 7 to 10 million people involved in outdoor programs, they had just one death.
- An Outdoor Adventure Organization reported that the risk of injury in outdoor adventure programs is about equal to insurance sales (wilderness-based is slightly higher).
- Statistically, the highest-risk part of the field work experience is driving to and from the field.

However, injuries and deaths do happen almost every week to people just like us who are in the backcountry. These are often experienced, skilled people who just make a “dumb mistake.”

- For example, the International Search and Rescue Database contains over 32,000 search and rescue incidents.
- U.S. national parks report an average of 9.2 injuries per 100,000 visits (muscle-skeletal [sprains and breaks], water-related, and falls are most common).
- Out of 63,700 geologists employed in the U.S., the Dept. of Labor reported 47 to 177 serious injuries per year over a 10-year period.
- The Utah Geological Survey, USU Geology, and many other departments have had some incidents and close calls over the past two decades.

Most Common Serious Non-vehicular Field Injuries to U.S. Geological Survey Geologists

- 1- Slips, trips, and falls
- 2- Back injuries
- 3- Broken limbs
- 4- Insect bites/stings – mostly bee stings

Most Common Reasons back country visitors are injured or killed:

- falls
- drowning
- heart attacks
- hypothermia/exposure
- heat stress
- lightning
- avalanche
- flash floods
- insects
- snakes, spiders
- predators

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HAVING THE RIGHT MENTAL ATTITUDE

Print, Read, Learn (in Mapping Common area - copyright law allows you to make one copy for personal use)

- A Dozen Ways to Die by Steve Howe in Backpacker, October 2006
- Why Smart People Make Dumb Mistakes (And How You Can Avoid Them) by Laurence Gonzales in National Geographic Adventure, August 2007

Common Factors Leading to Injury Accidents

- Lack of experience
- Risk-taking attitude
- Over confidence (in some activities injury/death rates actually increase with skill – don't add to the statistics)
- Goofing off, carelessness
- High-risk activities (heights, steep slopes, speed)
- Weather changes (deteriorating weather)
- Working on or near water
- Working with or near mechanical equipment
- Fatigue (accident rates definitely do increase in the afternoon)

Why Smart People Make Dumb Mistakes – and what to do about it!

- Recognize that we are prone to make mistakes (often, the more experienced we become, the more prone we are to be casual, i.e. – careless)
- Stop – force yourself to think about safety
- Make a safety checklist – review it before each trip
- Watch for signs of a wandering mind
- Watch for signs that a situation is deteriorating (weather, my health, my attitude, terrain, etc.)
- Ask yourself these questions:
 - What is my ultimate goal? Hint: It is NOT to complete the task. It IS to return home safely at the end of the day or project.
 - What are the dangers I could face in this activity?
 - How much am I willing to risk?
 - What are the warning signs I might see that a situation is deteriorating?
 - What is my plan for “bailing out” before things get bad?
 - How bad does it get before I quit?

- from article in National Geographic Adventure by Laurence Gonzales, Aug. 2007

When something bad happens – S.T.O.P.

- Stop – sit down, slow your breathing, calm yourself, sip some water, suck on some candy. Even in an emergency – take a few seconds; do not make one tragedy become two.
- Think – force your analytical mind to take over; resist the urge to panic, react automatically, or make hasty reactions
- Observe – your surroundings, your own condition, your resources, your options

- Plan – make a decision, then proceed slowly and thoughtfully (but alter the plan if needed)

When something bad happens – who survives?

- People who believe in themselves
- People who have a strong will to live
- People who “use their head” (see S.T.O.P. above)
- People with survival skills
- People who are prepared (gear and training)

After an incident:

- fill out an incident report ASAP; document
- meet with your supervisor, etc.

SPECIFIC SITUATIONS ALLERGIES, ANIMALS, LIGHTNING, HEAT, COLD, AND MUCH MORE

This manual does not attempt to cover specific situations – there are far too many to cover here. Field workers should study information on the specific conditions, situations, dangers, and emergencies they might encounter in the field in the following excellent resources. Please study them thoroughly. Photocopies of some materials are free for the taking.

Information from Internet

Hypothermia and Other Cold-Related Injuries - Outdoor Action Guide
Lightning - Updated Recommendations
Living with Wildlife in Lion Country
Living with Wildlife in Bear Country
Bears – Brochures, Pepper spray questions/answers
Snakes
Twenty-five Important-but-Often-Overlooked Outdoor Health Tips
Driver Fatigue

Recommended Publications

Health and Safety Code Handbook – U.S. Dept of Agriculture, Forest Service
Guide to Safe Field Operations – USGS OFR 95-777
Camping and Wilderness Survival – Paul Tawrell
Field Safety in Uncontrolled Environments – AAPG
Desert Survival Handbook – Charles A. Lehman
Planning for Field Safety – American Geological Institute
Kennecott Exploration Field Guide
Do not Get Bitten – Buck Tilton
Do not Get Eaten – Dave Smith
Do not Get Sick – Buck Tilton and Rick Bennett
UGS Mapping Program Field Safety Notebook
(Miscellaneous info: newspaper clippings, company product information, internet chat-room discussions regarding products, real stories, etc.)

ACKNOWLEDGMENT OF PARTICIPANT

By signing this statement, I acknowledge and certify that the following actions and communications were performed in a clear manner.

I was informed of the procedures, regulations, and sources of risk. I have had sufficient time to read the materials provided, and I was informed in a safety seminar by the instructor of the procedures, policies, and risks involved.

I was given opportunities to ask questions, both in private and in public, to clarify any of the information provided.

I provided a full and truthful statement of my health status, and I was provided opportunities to discuss any health issues with the instructor.

It was made clear that risk assessments and general planning have occurred for this class, but that no one can foresee all risks and situations in this class.

I am aware that IF AT ANY TIME, I violate these safety or field guidelines, and the instructor[s] deem my behavior to have contributed to an unsafe or inappropriate learning environment, the instructors have the right to rectify the situation. This might include a discussion with me and/or other students to correct the behavior, and/or it may lead to immediate removal from the course, in which case, participants are provided a ride to the nearest public transportation to return to Logan.

Signature of Student

Date

Signature of Instructor

UTAH STATE UNIVERSITY, GEOLOGY DEPARTMENT FIELD RESEARCH SAFETY PLAN (TEMPLATE)

This template may be used by the Principal Investigator (PI), or Project Manager, to **assist** with the development of a Safety Plan. **The completed Safety Plan should be shared with all the members of the field research team.** Multiple trips to the same location can be covered by a single Safety Plan. The Safety Plan should be revised whenever a significant change to the location or scope of fieldwork occurs.

Section I.

Principal Investigator/Project Manager:		Department:	
Phone:		Email:	
Project Duration:			

Location of Field Research

Country:		Geographical Site:	
State or County:		Nearest City:	
Nearest Hospital or Other Health Facility:		Phone Number:	

Attach map with driving directions from field site to nearest hospital or health care facility

USU Contact Person:		Phone:	
Local (Field) Contact Person:		Phone:	

Field Work Personnel (Attach separate sheet of paper if necessary)

Name	Affiliation, Phone, Emergency contact #s and names	Category (check all that apply)			
		Leader	Team Member	Other (specify)	Trained First Aider
		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>

Section II.

Field Research Study/Project: Describe scope of fieldwork or activity. (Attach separate sheet of paper if necessary). Please include county names, county Sheriff numbers, and general GPS coordinates of boundary of the study area. If you plan to be out of this area, describe your plan to let people know.

Hazards Inherent to the Project (Check all that Apply)

Environment

- High Altitude
- Extreme Temperature
- Excessive exposure to sun, wind, etc.
- Work Over/Under Water
- Diving

Accessibility

- Remote Location
- Long Distance to Medical Services
- Difficult Communications with the outside world

Terrain

- Rough/Unusual Terrain
- Flash Flood Potential
- Falling Objects (avalanches, rock falls, etc.)
- Work along roadway shoulders (Attach traffic control plan and permit, if required)
- Heights (trees, cliffs, etc)
- Disaster Area
- Violence (political, military, etc)

Work Tasks

- Work in Confined Space (natural or man-made)
- Trenching/Excavating
- Work at Night/Poor Lighting
- Noise Generated > 85 dBA
- Dusts/Other Particulate Hazards
- Potential for Oxygen Deficiency or Other Atmospheric Hazard (i.e. gas, vapor)
- Hazardous Waste Generation
- Transportation of Hazardous Materials
- Handling Hazardous Materials
- Storage of Hazardous Materials on site
- Lack of Potable Water
- Lack of Sanitary Facilities
- Flying Debris or Impact
- Electrical Hazard
- Fire Hazards (wildfires)
- Diving
- Climbing/Strenuous Hiking Required

Flora/Fauna

- Wild Animal Hazards
- Venomous/Poisonous Animals: _____
- Insects as Known Disease Carriers
- Trapping/Handling Animals: _____
- Toxic/Poisonous Plants: _____

Equipment Used in Field Area

- Snowmobile/ATV
- Boat/Canoe/Kayak
- Forklift

Materials Brought to Field Area

- Chemicals
- Biological
- Radiological
- Other: _____
- No Known Hazards

Section III.

Safety Plan: Describe safety provisions or procedures for the hazard(s) identified in the field research activities. (Attach separate sheet of paper if necessary)

Personal Protective Equipment or Clothing Required: All field activities require basic protection including appropriate field clothing, hand protection, safety shoes/boots, and eye protection. Any additional PPE requirements based on the hazards identified as part of minimizing risk of exposure, injury or illness. (Check all that Apply)

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> <input type="checkbox"/> Face Shields <input type="checkbox"/> Hearing Protection <input type="checkbox"/> Hard Hat <input type="checkbox"/> Rain Gear | <ul style="list-style-type: none"> <input type="checkbox"/> Respirator:
Type: _____
Cartridge/Filter Type: _____ | <ul style="list-style-type: none"> <input type="checkbox"/> Portable Eye Wash <input type="checkbox"/> Emergency Shower <input type="checkbox"/> Fall Protection <input type="checkbox"/> Extraction Equipment (Confined Space) <input type="checkbox"/> Other: _____ |
|---|---|--|

Travel Immunizations: List any required immunizations/prophylaxis required for this field study

Preparedness (Check all that Apply)

- Medications (Taken on a Regular Basis)
- Allergy Treatments (as needed)
- Adequate Food and Water Supplies
- Water Purification Tablets or Filter Devices
- Other: _____

Safety Training Required

<input type="checkbox"/> First Aid/CPR	<input type="checkbox"/> Biosafety
<input type="checkbox"/> Emergency Action and Preparedness	<input type="checkbox"/> Radiation Safety
<input type="checkbox"/> Project Specific Hazard Communication	<input type="checkbox"/> Laser Safety
<input type="checkbox"/> OSHA Carcinogens	<input type="checkbox"/> Respiratory Protections
<input type="checkbox"/> Compressed Gasses and Cryogenic Liquids	<input type="checkbox"/> Forklift/Other Heavy Equipment
<input type="checkbox"/> Hot Works	<input type="checkbox"/> Confined Space Entrant/Attendant/Supervisor
<input type="checkbox"/> Dangerous Good/Hazardous Materials Shipping	<input type="checkbox"/> Heat Illness Prevention
<input type="checkbox"/> Certified SCUBA Diver	<input type="checkbox"/> Other: _____

Section IV.

Emergency Plan/Procedure: Describe emergency response procedures in an event of an injury, exposure, accident, or other emergency situation. Include emergency communication, evacuation plans, etc. (Attach separate sheet of paper if necessary)